The Dissertation Committee for Lauren Tiffany Smith Certifies that this is the approved version of the following Dissertation:

Identifying factors of parent engagement in a school-based mental health intervention: an mHealth approach

Committee:

Erin M. Rodriguez, Supervisor

Sarah Kate Bearman

Susan De Luca

Delida Sanchez

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by

Lauren Tiffany Smith

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Abstract

Identifying factors of parent engagement in a school-based mental health intervention: an mHealth approach

Lauren Tiffany Smith, PhD

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Supervisor: Erin M. Rodriguez

African American and Latinx youth display higher rates of mental health concerns when compared to their White peers (SAMSA, 2015), while also demonstrating low rates of mental health care access. Systemic factors are typically linked to access to care (e.g., financial constraints, transportation, experiences of racism, and stigma) are often cited as culturally based, and are linked to the presence and exacerbation of mental health concerns (Garcia & Duckett, 2009; Gary, 2009; Hines-Martin, Malone, Kim, & Brown-Piper, 2009; Nadeem et al., 2007; Young & Rabiner, 2015). School-based mental health services improve access to care for historically underserved populations by alleviating commonly cited barriers to care (Green et al., 2013). Parental engagement in interventions help to support sustained positive outcomes over time (Shochet et al., 2001; Walczak, Esbjorn, Breinholst, & Reinholdt-Dunne, 2016). Cognitive-behavioral and family systems school-based interventions in particular view parents as integral to the process of change (Carpentier et al., 2007; Frazier, Abdul-Adil, Gathright, & Jackson, 2007; Gillham et al., 2006) yet minimal effort has been made to completely engage parents in the intervention itself. Parental engagement in school-based interventions is often hindered by factors (e.g., work demands, transportation) that prevent access to child mental health care overall (Koonce & Harper, 2011). mHealth (i.e., text message/SMS) interventions may increase parental engagement through the use of smartphones

(Franklin, Waller, Pagliari, & Greene, 2006). Although mHealth interventions have indicated success in improving attrition rates through the convenience of accessing intervention content from a cell-phone (Howells et al., 2014; Martin, 2012), there is an absence of mHealth literature examining the efficacy of this approach as a tool for parental engagement in school-based mental health interventions. The purpose of the current study was to examine parent engagement an mHealth component in a school-based intervention as a measure of parent engagement, using a mixed methods design. A total of 34 parents participated (91% mothers, 80% Latinx, 21% Spanish-speaking). Correlation and regression analyses were conducted to examine research questions, and thematic analysis was used to interpret qualitative findings. Results indicated that the majority (74%) of parents responded $\leq$ 40% of the time to weekly text messages. Correlation and regression results were not statistically significant for the relationship between text message response rate, socioeconomic status, and neighborhood factors, and effect sizes were small or close to zero (*r*'s from -.22 to .19). Qualitative data highlighted that technology, parent's literacy level, community resources, transportation accessibility, and parent's outcome expectancies can affect engagement in school-based services. A total of 10 themes emerged from the data. Findings from the study suggests that mHealth approaches require consideration of systemic factors that impact African American and Latinx parent's interactions with services. Clinical implications are discussed.

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Chapter 1: Introduction

Roughly 1 in 5 youth between the ages of 13-18 (Prevalence of Any Mental Disorder Among Adolescents, 2019) experience mental health related concerns at some point throughout development. Unfortunately, these rates disproportionately affect African American and Latinx[1] youth. Yet, in the context of mental health care, their degree of access is alarmingly low compared to same aged White youth (Lipari, Hedden, Blau, & Rubenstein, 2016). Common barriers to care for both groups typically stem from larger systemic issues often outside of the family's control. These concerns include: insurance constraints (e.g., lack of insurance coverage provided to low-income families or insurance coverage failing to cover mental health services), transportation difficulties for families residing in communities with unreliable public transportation, language barriers within the mental health care system, stigma associated with receiving care, and experiences of systemic discrimination and racism (e.g., being treated more negatively by service providers compared to their White counterparts; Edge et al., 2007; García, Gilchrist, Vazquez, Leite, & Raymond, 2011; Garcia & Duckett, 2009; Hines-Martin, Malone, Kim, & Brown-Piper, 2009; Young & Rabiner, 2015). Given the inevitable reality of the concerns mentioned above, African American and Latinx youth's mental health remains a concern (Burns et al., 2004; Corrigan, Torres, Lara, Sheehan, & Larson, 2017).

[1] Latinx defined as an inclusive classification for individuals and communities of Latin descent that may not ascribe to the traditional gendered use of Latino/a (Milian, 2017)

School-based mental health services play a vital role in reducing access barriers by providing services to people of color and low-income families (Green et al., 2013). Although some mental health services in schools lack empirical support (Farahmand, Grant, Polo, Duffy, & DuBois, 2011), the most promising practices that demonstrate a reduction of mental health symptoms over time are evidence-based (i.e., practices that have been examined through scientific methodology for their clinical impact on child and adolescent mental health; Hoagwood, Burns, Kiser, Ringeisen, & Schoenwald, 2001; Raes, Griffith, Van der Gucht, & Williams, 2014; Santiago, Fuller, Lennon, & Kataoka, 2016; Wasserman et al., 2015). Parental involvement has been shown to promote positive child academic and behavioral outcomes (Wang & Sheikh-Khalil, 2014). Therefore, some school-based intervention services seek to include a parent engagement component to further mental health care access (Frazier, Abdul-Adil, Gathright, & Jackson, 2007). However, the evidence is inconclusive about whether such parent components truly improve outcomes. The literature highlights several limitations to parental intervention engagement (e.g., transportation and time) that are particularly salient in families of color (Carpentier et al., 2007; Ellis, Lindsey, Barker, Boxmeyer, & Lochman, 2013).

One goal of mHealth (i.e., text message/online content) interventions is to reduce such treatment engagement barriers through the use of technology (Franklin, Waller, Pagliari, & Greene, 2006; Militello, Kelly, & Melnyk, 2012; Whittaker et al., 2012). While mHealth can be a promising tool for increasing participant engagement (Fjeldsoe, Miller, & Marshall, 2010), the research literature examining its utility in school-based mental health interventions is scarce.

The purpose of the current study is to examine parental engagement in an mHealth component of a school-based mental health intervention with African American and Latinx middle school students. The study draws from data collected with a sample of African American and Latinx parents across three public middle schools in Central Texas. The study describes rates of parental engagement in mHealth components of the program (i.e., text message response rate, number of visits to intervention website, completion of assessments electronically), and examines associations between parental engagement (measured through text message response rates), socioeconomic and community characteristics (e.g., availability of mental health services within their community, distance from school to home address), and treatment expectancy. The study also explores other potential factors influencing parental engagement through qualitative interviews.

Chapter 2: Literature Review

MENTAL HEALTH DISPARITIES

African American and Latinx youth have lower rates of mental health service utilization compared to their White counterparts (Kataoka, Zhang, & Wells, 2002; SAMSA, 2017). These disparities in service utilization accompany various risks for mental health problems experienced by African American and Latinx youth (Bui & Takeuchi, 1992).

Mental health risk and disparities in African American youth. African American youth are often at risk for externalizing mental health concerns (e.g., conduct problems; Roberts, Roberts, & Xing, 2006) given their increased exposure to negative environment factors (e.g., poverty, violence; Mason, Cauce, Gonzales, Hiraga, & Grove, 1994; Li, Nussbaum, & Richards, 2007). Studies that have addressed the etiology of depression in African American youth identified positive relationships between exposure to negative neighborhood characteristics (e.g., poverty, community violence) and internalizing psychopathology development (Fitzpatrick, Piko, Wright, & LaGory, 2005; Hurd, Stoddard, & Zimmerman, 2013; Sanchez, Lambert, & Cooley-Strickland, 2013). Indeed, rates of depression tend to be the highest among low-income African American youth that are at increased risk for community violence exposure (Liu, Bolland, Dick, Mustanski, & Kertes 2015).

Exact internalizing prevalence rates in African American youth have been inconclusive (e.g., Anderson & Mayes, 2010; Gaylord-Harden, Ragsdale, Mandara, Richards, & Peterson, 2007). Nonetheless, studies have suggested that these youth exhibit

higher internalizing mental health concerns compared to same-aged White peers (Kubik, Lytle, Birnbaum, Murray, & Perry, 2003). For example, in a 2007 study examining racial and ethnic differences in externalizing and internalizing symptoms in adolescents, African American youth endorsed higher rates of depression compared to White youth (McLaughlin, Hilt, & Nolen-Hoeksema, 2007). Epidemiology literature helps to further expound upon the differences in depressive disorder pathology between the two groups (Le, Tov, & Taylor, 2007), indicating that African American youth tend to demonstrate higher rates of persistent depressive disorder (i.e., a chronic form of depression that fluctuates over time in severity; DSM-V) when compared to White youth (Riolo, Nguyen, Greden, & King, 2004).

Depressive disorders and related symptoms also affect African American boys and girls at different rates. African American girls tend to experience higher rates of depressive symptoms, particularly during adolescence, compared to males (Grant et al., 2004; Twenge & Nolen-Hoeksema, 2002). In a study examining the relationship between poverty and depressed mood in a group of African American adolescents, African American girls were more likely than African American boys to endorse high levels of depressive symptoms resulting from poverty (Hammack, Robinson, Crawford, & Li, 2004). Other studies have cited similar findings indicating that when adolescent African American girls' exposure to stressors increase, they become more susceptible to depressive related symptoms (Assari & Caldwell, 2015; Carlson & Grant, 2008; Grant et al., 1999; Pratt & Brody, 2014). Further, depressive symptoms from adolescence into adulthood are higher in African American females when compared to White females

(Franko et al., 2005). However, when comparing African American female adolescents to same-aged Latinas, Latina adolescents display strikingly higher rates of depression (Brown, Meadows, & Elder, 2007; Siegel, Aneshensel, Taub, Cantwell, & Driscoll, 1998).

Mental health risk and disparities in Latinx youth. In 2014 national survey, Latinx teens were found to report higher levels of depressive symptoms (i.e., feelings of sadness or hopelessness for extended periods of time) compared to White and African American youth (rates 35%, 29% & 25% respectively; Pratt & Brody, 2014). Similar findings have been cited in other epidemiology literature (e.g., Kennard, Stewart, Hughes, Patel, & Emslie, 2006). Overall, mental health rate trends suggest that Latinx adolescents experience elevated rates of depression and anxiety compared to their peers (Céspedes & Huey, 2008; Lorenzo-Blanco, Unger, Baezconde-Garbanati, Ritt-Olson, & Soto, 2012; McLaughlin, Hilt, & Nolen-Hoeksema, 2007;). Elevated rates of depression specifically have been found regardless of nativity and generational status (Kubik et al., 2003; Roberts, Roberts, & Chen, 1997; Suarez-Morales & Bell, 2006; Umana-Taylor & Updegraff, 2007) and regardless of sub-group cultural background (Crockett, Randall, Shen, Russell, & Driscoll, 2005).

Similarly to African American adolescents, within Latinx adolescents, rates of depression differ by gender. Latina adolescents demonstrate higher trends of depressive symptoms compared to same-aged Latino males (Saluja, Lachan, & Scheidt, 2004). Research examining such gender differences even after controlling for risk factors (e.g., acculturation) have still found Latina adolescents to report higher rates of depression

compared to males (Carvajal, Hanson, Romero, & Coyle, 2002; Céspedes & Huey, 2008). To inform adolescent mental health care, Thomas, Temple, Perez, and Rupp (2012) examined ethnic and gender disparities in a sample of low-income youth and found Latina adolescents to be at the highest risk for major depression, particularly when compared to Latino adolescent males. Recently, the research literature has been keen on highlighting rates of depression in Latina adolescents in hopes of informing policy change to improve mental health service access (Foxen, 2016; U.S. Department of Health and Human Services, 2017).

The etiology of depressive symptoms in Latinx youth is a result of various environmental and cultural factors (Behnke, Plunkett, Sands, Bámaca-Colbert, 2011; Céspedes & Huey, 2008; Valera & Hensley-Maloney, 2009). Factors such as acculturation, immigration status, and socioeconomic status result in internalizing symptom development in Latinx youth (Heinrich et al., 2006; Romero & Roberts, 2003; Sirin et al., 2015; Suarez-Morales & Lopez, 2009; Varela & Maloney, 2009). For example, a study conducted in 2014 demonstrated the impact acculturation had on the development of depressive symptoms in Latinx youth (Stein & Polo, 2014). Similarly to African American youth, Latinx youth that live in high poverty neighborhoods (Truman & Langton, 2015) tend to report and experience depressive and other internalizing symptoms precipitated by their neighborhood's economic standing (Aneshensel & Sucoff, 1996; Gonzales et al., 2011; Leventhal & Brooks-Gunn, 2003).

Behavioral/mental health care access in African American and Latinx youth. The mental health disparities in African American and Latinx youth communities are hard to dismiss, yet their degree of mental health care access is worryingly low. Historically, rates of mental health care access amongst people of color have been lower than their White counterparts (Alegria, Vallas, & Pumariega, 2010) due in part to factors related to inequities of societal institutions. Persons of color often experience difficulty accessing mental health care due to factors related to high costs of behavioral health services, insurance coverage, language barriers, stigma, and experiences of racism from service providers (Kataoka, Zhang, & Wells, 2002; Williams & Jahn, 2017). For example, a multi-ethnic community sample (i.e., White, African American, American Indian, Asian, and Latinx) was surveyed to determine the cause for underutilization of physical and behavioral healthcare services (Burgess, Ding, Hargreaves, Ryn, Phelan, 2008). In that survey, U.S.-born African Americans and Latinxs were more likely to report experiences of discrimination from health care providers as the primary cause for underutilization of mental health care services (Burgess et al., 2008). In addition to discrimination, socioeconomic factors also influence African American and Latinx parents' service-seeking on behalf of their children. Having fewer financial resources and lower educational attainment are consequence of systemic inequities. For African American and Latinx families that are low-income, there are limited financial resources for behavioral health (Gaskin, Kouzis, & Richard, 2008; McMiller & Weisz, 1996; Zimmerman, 2005). Similarly, parents who report receipt of mental health services for their children often have higher levels of education compared to parents with lower

educational attainment (Gaskin, Kouzis, & Richard, 2008), although some research has not indicated a relationship between educational attainment and service seeing (Ryan et al., 2015).

There are also some factors uniquely associated with each group's access to care. For example, in African American adolescent populations, historical mistreatment and longstanding discrimination in the U.S. contribute to distrust of mental health providers and related systems (Copeland, 2006; Lindsey, Joe, & Nebbitt, 2010; Lindsey, Chambers, Pohle, Beall, & Luckstead, 2013). In contrast, Latinx parents tend to endorse factors related to insurance and communication challenges with service providers as barriers to care (Young & Rabiner, 2015). For monolingual Latinx Spanish-speaking parents seeking mental health care for their children, the absence of bilingual Spanish-speaking staff members can be a major deterrent (Alegría et al., 2006; Flores, 2006; Garcia and Duckett (2009).

SCHOOL-BASED MENTAL HEALTH SERVICES: A WAY TO REDUCE DISPARITIES FOR AFRICAN AMERICAN AND LATINX YOUTH

School-based mental health services are one of the main strategies for reducing mental health disparities, barriers to care, and increasing help-seeking attitudes and behaviors in African American and Latinx youth (Alegria et al., 2010; Burns et al., 1995). Seeking services within the school context present youth and their parents with a unique opportunity to receive immediate care from familiar adults, regardless of insurance status (Committee on School Health, 2004; Rickwood, Deane, & Wilson, 2007). School-based mental health services date back to the Progressive Era (i.e., the 1890s), but has

dramatically expanded since then and vary in treatment modality (Flaherty & Osher, 2003; Hoagwood & Erwin, 1997).

The degree to which school-based mental health services reduce mental health problems is heavily reliant upon its empirical basis (Farahmand et al., 2011). Evidence-based cognitive-behavioral interventions in schools tend to have the most efficacy in the literature for sustained positive outcomes following participation (Bernstein, Layne, Egan, & Tennison, 2005; Clarke et al., 1995; Morsette et al., 2009). For example, in a study of youth with social anxiety disorder randomized into a 12-week group providing cognitive behavioral coping skills and exposure to social situations, reported a substantial decrease in symptom severity that was also sustained at the 9-month follow-up compared to the control condition (Masia-Warner et al., 2005). The results of another randomized control study by Manassis et al. (2010) reported a significant reduction in anxiety and depressive symptoms following participation in a school-based cognitive behavioral group intervention. Other school cognitive behavioral interventions have indicated markedly better outcomes for participating youth from pre- to post-intervention (Harris & Franklin, 2003; Kataoka et al., 2003; Stice, Rohde, Seeley, & Gau, 2008; Raes, Griffith, Van der Gucht, & Williams, 2014).

Mental health services with empirical support continue to offer the most promising positive outcomes for ethnic minority youth compared to interventions that are not empirically supported (Armbruster, Gerstein, & Fallon, 1997; Atkins et al., 2006). By continuing to increase the presence and support of evidence-based school mental health

services, ethnic minority youth and their parents have increased access to services despite barriers (e.g., Bowers, Manion, Papadopoulos, & Gauvreau, 2012).

PARENT ENGAGEMENT IN CHILD MENTAL HEALTH SERVICES

Parent engagement in child mental health services has an active and influential role in youth treatment outcomes (Golan & Crow, 2004; Logan & King, 2001; Ungar, 2004). Parent engagement is defined as an active partnership between parents and service providers to facilitate communication and decision-making (Chovil, 2009), which can aid in positive intervention outcomes. For example, in one school-based intervention study, children of parents who had higher levels of communication with teachers conducting the intervention also reported lower levels of anxiety and greater parent-child attachment post-intervention (Sheridan, Knoche, Edwards, Bovaird, & Kupzyk, 2010).

When considering factors of parent engagement in communities of color, the availability of culturally-relevant intervention material has a direct influence on engagement (e.g., McDonald et al., 2006). McDonald and colleagues (2006) specifically examined the effects of parent engagement in a randomized controlled trial (RCT) of a culturally-sensitive intervention to both boost Latinx parent involvement and improve child well-being. Parents within the intervention group received eight weekly sessions on topics that were tailored to both the child's school and home culture, whereas the control group received pamphlets regarding general behavioral management strategies that were not culturally specific. Parents in the intervention group indicated higher levels of involvement compared to the control condition. Additionally, the researchers found that the intervention group's involvement was not only noticeably higher, but they also began

to demonstrate significant levels of involvement in other school activities following the intervention (McDonald et al., 2006).

Researchers have also examined the impact of parental engagement on child intervention outcomes. For example, a cognitive-behavioral intervention was conducted to examine the effects of parent engagement on childhood social phobia across three conditions: both parent and child intervention involvement, only child intervention involvement, and a waitlist condition (Spence, Donovan, & Brechman-Toussaint, 2000). Parent involvement within the first condition included teaching parents to model and promote skill practice outside of each session. Parents in this condition also could observe their child's sessions in-vivo and be provided handouts with explicit details regarding each session's content. Lastly, this group of parents received 30 minutes of weekly parent training (Spence et al., 2000). In reviewing treatment outcomes of each condition, parents in the parent + child group were found to rate their child's skill attainment higher and a reduction in clinical social phobia at the 12-month follow up compared to the other two conditions. Additionally, children in both the parent + child group and the child-only intervention group reported a reduction in their anxiety symptoms post-intervention. Despite both intervention groups indicating success in reduction of anxiety symptoms post-intervention, the parent engagement group demonstrated significantly higher treatment effects indicating the value of parental involvement in anxiety interventions for both skill attainment and symptom reduction (Spence et al., 2000).

In other studies that have incorporated parents in interventions, parents were given telephone consultations, access to resources (e.g., books and videotapes; Connell, Dishion, Yasui, & Kavanagh, 2007), and coaching support to assist in their child's implementation of various skills both during and after the intervention (Kasari, Gulsrud, Wong, Kwon, & Locke, 2010; Masia-Warner et al., 2005; Rones & Hoagwood, 2000). Results of these studies highlighted that the parental components helped parents to report reduced behavioral symptoms in their child, and therefore suggesting the benefits of parental involvement in child mental health interventions to increase intervention outcomes.

Overall, parent engagement results in improved child mental health. However, more research is needed to identify factors related to parent engagement in order to better understand ways to promote engagement (Cowan, Cowan, Pruett, Pruett, & Wong, 2009; Gopalan et al., 2010; Mendez, Carpenter, LaForett, & Cohen, 2009; Miller & Prinz, 2003).

Parental engagement in African American and Latinx families. Both individual/family and systemic factors have been linked to parent engagement in African American and Latinx families. However, it is important to note that some individual factors (e.g., parental stress) may be the downstream effect of overarching systemic factors. Families of color tend to be at an automatic disadvantage with service access and engagement due to institutionalized disparities related to race, ethnicity or socioeconomic status, which warrants examination of individual level factors that affect engagement.

At an individual level, parent engagement appears to be affected by parental stress and parent-child relationship quality (Prado, Pantin, Schwartz, Lupei, & Szapocnik, 2006; Webster-Stratton, Reid, & Stoolmiller, 2008) as well as desire and expectations for child behavior change (King, Currie, & Petersen, 2012). At a systemic level, lower levels of parental engagement have been linked to perceived discrimination, over-pathologizing from service providers, and long, inflexible work days (Anderson et al., 2006; Curtis & Singh, 1996; Langley, Nadeem, Kataoka, Stein, & Jaycox, 2010). Parent work schedules may be related to parent education levels, such that parents with higher levels of education have more work flexibility and engagement capacity. Both individual-level factors and systemic factors associated with parent engagement are described below in more detail.

Individual-level factors associated with parent engagement. Desired behavioral changes influence parent involvement in mental health services in the child and expectations for treatment (King et al., 2012; Morrissey-Kane & Prinz, 1999). Gross, Julion, and Fogg (2001) described the processes by which motivation for noticeable and sustainable behavioral change influenced intervention engagement by low-income urban families of color. In a 12-week parent behavioral management training intervention to address child behavioral concerns, parents that expressed an initial desire to receive more information regarding age-appropriate behavioral management strategies also demonstrated higher levels of engagement. The researchers of this study also compared these findings to parents who did not express the same desire pre-intervention. The findings from Gross et al. (2001) have been supported in other studies examining parent

intervention involvement. For example, in a parent-centered prevention intervention designed to reduce substance use behaviors in adolescents of color, there was a difference in engagement levels between parents who perceived a need for intervention compared to parents who did not. More specifically, the study's findings indicated that African American and Latinx parents' expressed need for intervention increased their engagement from pre- to post-intervention compared to parents that reported a lower need(Perrino, Coatsworth, Briones, Pantin, & Szapocznik, 2001).

Parent expectations about child outcomes following treatment also factor into engagement (Nock, Ferriter, & Holmberg, 2006). For example, parents that had higher expectations for treatment outcomes in a behavioral parent training intervention for children with ADHD also demonstrated higher levels of involvement with the intervention compared to parents with lower reported need and expectations (Chacko, Wymbs, Chimiklis, Wymbs, & Pelham, 2012). These findings are consistent with other research suggesting that parents with lower treatment and behavioral change expectations also have lower levels of engagement (Larson et al., 2011; Stevens et al., 2009; Van Den Hoofdakker et al., 2007). However, the factors that influence engagement have typically been examined in clinical contexts and less commonly in school-based services. As a result of this gap in the literature, there is a need for further examination into the relationship between parent engagement and treatment expectancy in school-based services.

Systemic factors related to parental engagement. Several socioeconomic and neighborhood-level factors are also related to parental engagement in children's mental

health services. For example, income level and work demand associated with low-wage jobs appear to play a role in parents' ability to participate in interventions, even if a desire to receive support is expressed (McLoyd, 1990). Despite recognizing mental health concerns in their children, low-income parents of color often report lower mental health service engagement due to work schedule conflicts (Yeh et al., 2005). Living in impoverished neighborhoods also strongly impacts the presence of engagement with services as a result of limited community resources (McKay & Bannon, 2004; Murry, Berkel, Gaylord-Harden, Copeland-Linder, & Nation, 2011). When examining neighborhood SES and access to care, Kirby and Kaneda (2005) found that individuals living in socioeconomically disadvantaged neighborhoods were more likely to report inconsistent engagement with systems of care due to limited community resources.

Another influential engagement factor is the reliance upon social networks for mental health support, which may be related to higher levels of community cohesion in socioeconomically disadvantaged communities (Hurd, Stoddard, & Zimmerman, 2013). The reliance on social networks is not uncommon and is often beneficial for families (Campbell & Lee, 2018). However, reliance on social networks may diminish seeking more traditional forms of mental health care. In a study conducted by Harrison, McKay, & Bannon (2004), mental health service use was examined in a sample of inner-city youth and their families. Findings from the study highlighted that the primary cause for lack of engagement with mental health services was related to the impact of neighborhood social networks (e.g., parents consulting members of the community regarding child's socio-emotional concerns). More specifically, parents in the study were

found to be more likely to consult family as opposed to mental health professionals or service providers when mental health concerns were present in their children (Harrison et al., 2004).

Another systemic factor influencing mental health service utilization is access to transportation (Committee on School Health, 2004). O'Campo, Salmon and Burke (2009) took a qualitative approach in examining the pathways between neighborhood characteristics (e.g., access to transportation) and service seeking. Participants that resided in areas with reduced transportation access and neighborhood walkability were more likely to discuss difficulties in accessing social services. Another study found that individuals residing in more rural or suburban areas were more likely to report reduced access to public transportation, which consequently affected their ability to receive care as needed (Bull, Krout, Rathbone-McCuan, & Shreffler, 2001). The ability to access public transportation is related to access to care (Diez Roux & Mair, 2010) but its relationship specifically to parent engagement in school-based interventions has not been explored.

The current study examined several systemic factors that could influence parental engagement in child school-based mental health services. First, this study examined distance from the child's residential address to the nearest public transportation. Second, the current study also examined socioeconomic status (measured through median household income). Third, the study examined neighborhood unemployment rate as a proxy for neighborhood cohesion and social networks.

Parent engagement with schools. Parental involvement in their child's school serves a critical role in successful child development (Jesser, 1993). Parent engagement includes a variety of both home-based and school-based actions that support their children's achievements (Harris & Goodall, 2008). For example, in one study African American parents reported more home-based involvement (e.g., assistance with homework, scaffolding educational activities-visits to the local library) compared to school-based involvement (e.g., meeting with teachers, regular attendance to school events/PTA meetings), and higher levels of home-based involvement were positively associated with academic achievement when academic socialization was also present (Wang & Sheikh-Khalil, 2014). Both low-income African American and Latinx parents, have been shown to demonstrate higher rates of home-based involvement (e.g., homework help) compared to White parents (Park & Holloway, 2014). In another study, Domina (2005) found that lower-SES parents valued school involvement more than higher-SES parents, but their engagement fell short of active school-based involvement behaviors (e.g., volunteering, parent-teacher association membership).

Numerous factors may result in lower levels of school-based involvement in low-SES African-American and Latinx families. Work constraints for parents may reduce their involvement in their child's school (Murray et al., 2014), as well as a lack of paid leave and family responsibilities (Murray et al., 2014; Snell, 2018; Williams & Sanchez, 2012). Another commonly cited factor related to reduced school-based involvement is negative perceptions of the school and personnel, which may be related to parents' own experiences of discrimination in school. For instance, Park and Holloway (2014) found

that African American and Latinx parents were more likely to relate their lack of school involvement to minimal satisfaction with the school as a system. Additionally, parents' negative perceptions of the school system are also reinforced by beliefs regarding the lack of effort of school staff to relay important information in a timely and organized fashion, consequently creating more difficulty for parents that have other competing life demands (Murray et al., 2014). Frustration with school personnel is also related to lower school-based involvement. Perceptions of negative attitudes from teachers and other school personnel may be sources of frustration for parents, such that when parents perceive teachers to disrespect or use inappropriate language with their children, they are less likely to have school-based involvement (Murray et al., 2014). Finally, for monolingual Latinx Spanish-speaking parents, a lack of bilingual school staff can limit parental engagement because information is only provided in English (Snell, 2018).

Parent engagement in school-based interventions. Given the unique nature of schools as a hub for mental health treatment for historically underserved youth (Atkins et al., 2006; Cappella, Frazier, Atkins, Schoenwald, & Glisson, 2008), it is also essential to understand the degree to which parents are engaged in school-based mental health interventions. In school-based mental health interventions, parents are viewed as the gateway for change in the child's functioning (Stolberg & Mahler, 1994). With this in mind, ensuring that barriers to family engagement in school-based services are reduced is pivotal in both intervention development and delivery (Frazier, Abdul-Adil, Gathright, & Jackson, 2007; Nock & Photos, 2006).

Several interventions have demonstrated success in engaging parents through various strategies. Engaging parents directly in the intervention process itself (i.e., receipt of individual therapy sessions at the school or at the home with clinicians alongside the child) has been highlighted as a way to increase both parental engagement and treatment satisfaction (Auster, Feeney-Kettler, & Kratochwill, 2006; Owens et al., 2005; Santiago et al., 2013). By providing parents with useful skills (e.g., behavior and emotional regulation strategies) to best support their children both at home and school, high levels of engagement are more likely (Stormshak, Fosco, & Dishion, 2010). Further, previous engagement with mental health systems or helpers can be indicative of future engagement with school-based interventions (McKay et al., 2004). For example, Lindsey, Chambers, Pohle, Beall, and Lucksted (2013) found that when African-American parents reported previous help-seeking behaviors, parents and adolescents also indicated stronger support for future serve engagement. These findings suggest that when systemic barriers to access and engagement are improved (e.g., transportation, culturally competent providers and systems of care), families may have positive experiences with mental health services and be more receptive to future school-based services.

However, even when some barriers are reduced, parental participation in school-based interventions can remain a challenge (Koonce & Harper, 2011; Vanderbleek, 2004). For example, one study attempted to engage Mexican-origin families in a culturally sensitive school-based prevention intervention and experienced low parental acceptability and issues maintaining consistent contact with families due to the families' high rates of mobility (Carpentier et al., 2007). The intervention was adapted to

accommodate both English and Spanish speaking families, and engagement was measured through initial home visit completion and attendance at subsequent parent sessions. Despite intervention adaptations to account for typical barriers associated with Latinx family mental health treatment engagement (e.g., bilingual interventionist staff members, cultural adaptation of intervention material, increasing access to the intervention; Kouyoumgjian, Zamboanga, & Hansen, 2003) levels of engagement were low amongst monolingual Spanish-speaking parents (Carpentier et al., 2007). Therefore, novel approaches may be needed to address these additional systemic barriers to school-based mental health care.

mHealth INTERVENTIONS

Within the last decade, the number of mHealth (i.e., mobile phone, text message based) interventions have grown exponentially (Ali, Chew, & Yap, 2016; Free, Phillips, Felix, Galli, Patel, & Edwards, 2010). mHealth interventions provide individuals with access to mental health related information or services electronically (e.g., video, text message, voice recordings) through various platforms (e.g., tablet, smartphone) as opposed to traditional in-person settings (Cashen, Dykes, & Gerber, 2004; Myers & Comer, 2016). There are mixed findings regarding the extent to which text message-based interventions demonstrate efficacious outcomes. In a review of text message interventions, it was found that most text message interventions demonstrate great variability in improved health outcomes, participant compliance and acceptability (Fjeldsoe, Marshall, & Miller, 2009). A study with high school students examining alcohol use and coping behaviors utilized a mobile program and diaries to capture this

data (Kauer, Reid, Sanci, & Patton, 2009). Interestingly, the results of this study pointed to less frequent use of the mobile program in older adolescents (i.e., ages 16 & 17) and stronger preference toward the use of diaries to record alcohol use, thus indicating minimal success in the implementation of a technology-based assessment. Similar findings have been reported regarding the use of mobile data, such that even when families were provided mobile phones to boost response rate, adherence and engagement outcomes were less than ideal (Cafazzo, Casselman, Hamming, Katzman, & Palmert, 2012).

mHealth interventions and persons of color. A number of text-message based interventions specifically tested with ethnic minority samples targeting both health and mental health outcomes have demonstrated benefits for intervention efficacy and attrition. One study examined the feasibility and usability of a diabetes management text message intervention in a African American sample (Dick et al., 2011). Participants in the study received personalized daily and weekly text message reminders with information regarding their diabetes management and medication use. Additionally, study participants received weekly telephone interviews that were used to capture feedback regarding their experiences with the text message intervention and improvements were made based on feedback provided during the call. The results of the study indicated that participants reported greater diabetes management, which was related to increased levels of engagement with the intervention (Dick et al., 2011). Similar findings were cited with a Latinx sample regarding their experience in a text message-based intervention targeting diabetes management (Burner, Menchine, Kubicek, Robles, & Arora, 2014).

Text message interventions have also been used to enhance parental engagement in child health related services in families of color. Typically, these interventions focus on providing parents with greater education regarding the health condition targeted by the intervention. For example, an intervention seeking to increase influenza vaccinations in a predominately persons of color sample found that by including information via text regarding the purpose of the vaccination while also debunking common misconceptions regarding vaccinations helped to increase engagement levels and also increased frequency of vaccinations (Stockwell et al., 2012). Another study seeking to increase vaccination practices in preteen African American males found that by providing parents with texts containing health-related information regarding the vaccination and health implications associated with delayed vaccination, parents reported greater awareness and motivation toward vaccination (Cates, Ortiz, Shafer, Romocki, & Coyne-Beasley, 2012).

Positive outcomes have also been found for mental health mHealth interventions with minority samples. Aguilera, Schueller, and Leykin (2015) employed a mobile phone intervention to capture daily mood ratings of depressive symptoms in a sample of Latinxs that were recipients of a cognitive behavioral treatment for depression in a community clinic. Participants received daily automated text messages that asked them to rate their mood on a 1-9 scale, and the mood ratings were examined in conjunction with their weekly therapy sessions. Based on the study's findings, mood ratings were found to be a useful component alongside treatment, such that the study had an average text message mood rating response rate of 51.2% and the ratings were found to be predictive of

depressive symptom development that assisted in treatment planning (Aguilera, Schueller, & Leykin, 2015).

Other mHealth research efforts have been made to capture mental health symptom and behavior related information through the form of text messages and has demonstrated promising findings regarding increased levels of participant engagement (Chen et al., 2017). The study specifically developed an automated text message intervention for depression and autism spectrum disorder in children to aid in better monitoring and treatment efforts. Both studies had an initial response rate of 100% during the first 4 months, but this rate slowly declined over time, although both studies still found text response rates greater than 50% at the final follow-up timepoint. Additionally, caregivers in each intervention reported greater awareness of their child's mental health as a result of the weekly monitoring that was required (Chen et al., 2017). Increased awareness of mental health as a result of mood monitoring via text messages is commonly reported by participants (Depp et al., 2010). Text message interventions with mood monitoring offer a promising strategy in the mental health field to promote awareness of mental health symptoms and increase/maintain service engagement, particularly in ethnic minority families.

Improving the utility of mHealth interventions in communities of color. Atkinson and Gold (2002) offer several practical suggestions to guide implementation and improve outcomes of mHealth applications. The first suggestion pertained to tailoring messages to the target audience. In a discussion piece, Atkinson and Gold (2002) state that it is crucial to personalize messages based on race, age, and sex. By

individualizing messages for each participant based on these cultural considerations, higher response rates are more likely. Secondly, the platform used to convey the health-related information also requires careful consideration. It is recommended to use a platform that would allow for simulated examples (e.g., videos) to coincide with the intervention information. Lastly, prior to implementing any mHealth intervention, it is recommended that researchers/helping professionals explore the utility of the platform with technology experts. Within the process of testing the platform with experts, it is also noted that interventionists should perform a trial run of the intervention with a group that is demographically similar to the target population prior to full dissemination (Atkinson & Gold, 2002).

Sociodemographic factors such as literacy level, language, and cultural background should also play a role in the design of mHealth interventions. In a review of common access barriers to health-related information, Cashen, Dykes, and Gerber (2004) present numerous factors associated with general health literacy, indicating that certain demographic characteristics (e.g., lower educational background) greatly affect an individual's health status and their consumption of health-related information. Given the risk some cultural groups face regarding lower health care literacy compared to other groups, it is imperative that the technology and information conveyed in the mHealth intervention account for these factors (Cashen, Dykes, & Gerber, 2004).

Language is another contributory factor that affects the success of mHealth interventions (Cashen, Dykes, & Gerber, 2004). In a commentary on the future of technology-based health intervention platforms in Latinx populations, concerns regarding

language proficiency of users were discussed (Victorson et al., 2014). Despite Latinxs in the U.S. interacting with technology at increasing rates every year (Nielson, 2016), utility of technology is largely driven by cultural and linguistic factors (e.g., availability of material in Spanish, use of culturally sensitive content) which directly influences levels of engagement (Victorson et al., 2014). When interventions are tailored linguistically to address both language and cultural factors regarding mental health, Latinxs are more likely to construct a stronger relationship to the intervention and display greater levels of engagement (López, Tan-McGrory, Horner, & Betancourt, 2016).

Aside from general considerations in work with Latinx populations, cultural tailoring of text message-based interventions has been demonstrated to influence higher intervention engagement for all persons of color (Lustria et al., 2013). For example, in a text message intervention aimed to increase health behaviors in Korean Americans, community participatory efforts were included to tailor the intervention content to the population of interest. The intervention specifically sought to include Korean American health-related statistics and testimonies from Korean Americans who received care. The culmination of these culturally-based efforts resulted in increased health knowledge and access to care (Lee, Koopmeiners, Rhee, Ravels, & Ahluwalia, 2014).

A number of focus groups have also been conducted to explore the impact of text message-based programs in persons of color. For example, a study seeking to examine the efficacy and applicability of a mobile device, text message-based diet and exercise intervention in rural Mexican-American adolescents conducted several focus groups to capture information regarding factors that would influence engagement. They found that

participants were willing to engage with health information disseminated through text message given their current use and access to internet. Additionally, some of the participants associated receiving text messages with a greater ability to utilize their phones for additional health information (Collins & Champion, 2014). The findings help to offer hope regarding the future of mHealth interventions and its promising utility in under-resourced communities.

The research described above highlights the feasibility, cultural adaptations, and potential benefits of mHealth interventions for improving treatment engagement and health outcomes in minority youth and their families. Yet, little research has examined the utility of mHealth interventions in school settings, and even less is known about the efficacy and dissemination of text message-based interventions in schools with youth of color and their parents.

Chapter 3: Current Study

Mental health disparities continue to affect youth color at high rates (SAMSA, 2017) while numerous barriers to care continue to exacerbate these disparities (Lindsey, Joe, & Nebbitt, 2010; Chapman & Stein, 2014). School-based mental health services present a unique opportunity for historically underserved youth to receive care and have demonstrated some effectiveness in the reduction of risk for psychopathology (Atkins et al., 2006). However, most school-based interventions typically focus on youth involvement and therefore lack parental engagement (Koonce & Harper, 2011). Although some school-based interventions have demonstrated success in parental engagement efforts, there have been challenges in supporting parents of color's engagement (Kouyoumgjian, Zamboanga, & Hansen, 2003; Vanderbleek, 2004). mHealth (i.e., text message/SMS-based) interventions offer a unique opportunity to increase engagement levels of parents of color (Depp et al., 2010; Lustria et al., 2013). However, little research has examined the use of mHealth in the context of a school-based intervention to increase parental engagement. Therefore, the current study used an explanatory sequential mixed-methods approach to examine the utility of an mHealth intervention component to enhance parental engagement in a school-based mental health intervention for African American and Latinx middle school students. The mHealth component of the intervention involved weekly text messages to parents to summarize intervention content for each session. In addition, the weekly text included a link to online information and videos about the intervention content and solicited a weekly mood rating text response from the

parent. An additional mHealth aspect of the study was the option for parents to complete pre- and post-intervention assessments online (vs. by mail or in person).

RESEARCH QUESTIONS

Research Question 1: What are the rates of parent engagement with mHealth intervention content?

Question 1a: What are parent text message response rates to a weekly texting component of the intervention?

Question 1b: What percentage of parents complete pre- and post-intervention assessments electronically?

Question 1c: At what rates do parents access various components of the intervention website (main page, individual session pages, videos)?

Rationale: Research to date has demonstrated strong support for the benefits of parent engagement in child mental health interventions (Shochet et al., 2001; Walczak, Esbjorn, Breinholst, & Reinholdt-Dunne, 2016). These findings have been particularly supported in the context of providing parents with skills or information to support their children outside of intervention (Stormshak, Fosco, & Dishion, 2010).

However, when ethnic minority parental involvement is assessed in the context of school-based interventions, there are numerous attrition and acceptability issues (Carpentier et al., 2007; Kouyoumgjian, Zamboanga, & Hansen, 2003). With low-income families in school-based services, additional factors (e.g., inconsistent phone service, work demands) noticeably strain engagement levels at every stage of an intervention (Burnett-Zeigler & Lyons, 2010; Carpentier et al., 2007).

mHealth interventions aim to assist in the reduction of factors that are commonly associated with low participant engagement and have demonstrated success in increasing both engagement and overall access with health care systems (Aguilera, Schueller, & Leykin, 2015; Dick et al., 2011; Stockwell et al., 2012). But, the extent to which an mHealth approach can be useful as a tool of engagement for parents in school-based mental health interventions remains unknown. It is predicted that parents will overall exhibit low text response rates and interaction with electronic intervention content, with a noticeable decline in response rates following any disruption in group contact (e.g., during school holidays). It is also predicted that few parents will complete assessment questionnaires electronically.

Research Question 2: Is there a statistically significant relationship between parent text response rates and socioeconomic status (i.e., annual household income and educational attainment)?

Hypothesis: There will be a statistically significant positive association between parent text response rates and socioeconomic status.

Rationale: In the research literature, parents from socioeconomically disadvantaged backgrounds often display lower levels of engagement with child-based mental health services (Heinrichs et al., 2005; Prado, Pantin, Schwartz, Lupei, & Szapocnik, 2006). School-based interventions have helped to reduce traditional barriers to engagement (Atkins et al., 2006), yet ethnic minority parents continue to display reduced engagement and often cite factors such as parental stress and work constraints as

barriers to intervention involvement (Cowan et al., 2009; Langley et al., 2010; Webster-Stratton et al., 2008).

Research Question 3: What is the association between neighborhood-level variables and parental text response rates?

Question 3a: Is distance between home and school, and access to public transportation associated with parent text response rates?

Question 3b: Is neighborhood median household income and unemployment rate associated with parent text response rates?

Hypothesis: It is predicted that distance from the home to the child's school will be positively associated with parent text response rate, such that when distance increases text response rates will also increase. Additionally, distance from home to public transportation will be positively associated with parent text response rates. It is also predicted that neighborhood median household income will be positively associated with parent text response rates, while unemployment rates will be negatively associated with parent text response rates.

Rationale: Transportation barriers have a direct impact on African American and Latinxs' engagement in mental health services (Young & Rabiner, 2015; Williams & Jahn, 2017). When specifically examining parents' engagement with school-based services (e.g., interventions), transportation barriers are frequently cited by parents (Spoth & Redmond, 2000; Vanderbleek, 2004). Despite the current study offering an opportunity to reduce this barrier by engaging parents through smart phone intervention content (i.e., text messages and link to website data), transportation and related processes still warrant

further exploration as a factor influencing engagement in care. Previous literature has demonstrated that neighborhood factors related to transportation have been shown to influence ethnic minorities' overall mental health and interactions with systems of care (Bull, Krout, Rathbone-McCuan, & Shreffler, 2001; O'Campo, Salmon, & Burke, 2009). Similarly, access to resources due to socioeconomic status at the neighborhood level has been highlighted as impactful on parent engagement. To date, however, studies have not fully examined family's distance from school, neighborhood unemployment rates, and median neighborhood household income as factors impacting engagement. As research suggests, neighborhood factors (e.g., neighborhood median household income, unemployment rates) may affect the degree to which neighborhood cohesion (e.g., positive relationships with community members) and other community characteristics influence ethnic minority parents' trust and interactions with mental health care systems, indicating a need for further exploration. More specifically, neighborhoods with high levels of impoverishment are also neighborhoods with higher levels unemployment rates, and these neighborhoods tend to have lower neighborhood cohesion (i.e., knowing and interacting with neighbors infrequently) when compared to families with higher neighborhood cohesion (Caughy, O'Campo, & Muntaner, 2003) and therefore parents residing in communities with lower neighborhood cohesion may rely less on neighbors and community resources and be more likely to engage with services provided through the school and consequently the current study's text messages.

Research Question 4: Are parent reports of treatment expectancy and socioeconomic economic status (i.e.., annual household income, educational attainment) associated with parental text response rates?

Question 4a: Are pre-intervention treatment expectations correlated with parental text response rates?

Question 4b: Is treatment expectancy associated with parental text response rates after accounting for socioeconomic status?

Hypothesis*:* Parental treatment expectations will be positively correlated with text response rates. Above and beyond parent socioeconomic status, parental treatment expectancy will be positively associated with text response rates.

Rationale: Research indicates that parents with positive treatment expectations have higher levels of engagement with mental health services (Chacko et al., 2012). While socioeconomic status has been found to be positively associated with parental treatment engagement (Webster-Stratton, Reid, & Stoolmiller, 2008), treatment expectations appear to predict engagement even in parents from low-socioeconomic status backgrounds (Larson et al., 2011).

Research question 5*:* What additional factors may influence the degree to which parents engage in the mHealth components of the intervention?

Rationale: To date, most studies examining parental involvement in school-based interventions have taken a quantitative approach toward examining factors that affect engagement levels, with a heavy concentration on socioeconomic status, race/ethnicity, and target intervention behaviors (Carpentier et al., 2007; Chow, Jaffee, & Snowden,

2003; Perrino et al., 2001; Prado et al., 2006). Further, no research has examined parental engagement in mHealth components of a school-based intervention. This question will serve as further exploration into the quantitative parent engagement data gathered through text message response rates and engagement with electronic intervention content, This additional information will support development of hypotheses about factors influencing parental mHealth engagement in subsequent studies.

Chapter 4: Methods

PARTICIPANTS

Quantitative Study. Participants of the study included a sample of 34 parents/caregivers (31 mothers, 2 fathers, 1 grandmother) of children enrolled in a school-based intervention group in three middle schools in Central Texas. 80% of the sample identified as Latinx, while the remainder of the sample was African American. This part of the study was conducted from December 2016- December 2018.

Qualitative Study. A total of 15 (10 Latinx, 5 African American) mothers were contacted two months after the conclusion of the school group during the year of 2018 to complete brief 30-minute interviews regarding their participation in the study. These parents were identified based on their responsiveness to the study's text message and were assigned to two groups: low responders (responding to 40% or fewer text messages) and high responders (responding to 50% or more text messages). This sampling resulted in 11 low responders and 4 high responders, five of which were conducted in Spanish. Interviews were conducted from October 2018-December 2018.

PROCEDURES

Approval by the human subjects committee. This study followed the ethical standards of the American Psychological Association and was approved by the Institutional Review Board (IRB) at the University of Texas at Austin (IRB Protocol #2015-11-0097), and the IRB at Austin Independent School District. The parent/guardian of each child was asked to sign IRB-approved consent forms, while each child in the

study was asked to sign an assent form. Upon obtaining informed consent/assent, identifying personal information was separated from the research data in order to protect the confidentiality of the participants. Each participant was assigned an identification numerical code for data organization.

Quantitative study recruitment. Children in the 6th grade and their parents were identified by Communities in Schools (CIS) leaders at each school (*n*=3) through previous participation with the school-based organization due to various psychosocial concerns (e.g., self-esteem, family stressors). CIS is a dropout prevention campus-based program offered in public schools throughout Central Texas to provide resources to students to aid in academic success (CIS-Central Texas). Once potential students were identified, parents were contacted by each CIS lead. At that time, CIS leads discussed intervention participation with parents and asked them to sign IRB consent forms, which provided further information regarding the study. CIS leads and research personnel met with children individually to explain the research study and obtain written assent. Children and parents that did not wish to participate in the research study received resources and support from the CIS team at the school.

Parents that consented to participate in the study were contacted by the research team to complete a 45-minute pre-intervention and post-intervention questionnaire, where all baseline data measures were collected in addition to alternate contact information. All study measures were available in both English and Spanish, and bilingual research personnel assisted in answering study-related questions and helped parents with the completion of pre-intervention questionnaires (e.g., demographic survey). Parents

received the option to complete the questionnaires either by phone, online via a link sent to their email address, postal mail, or in-person during a home visit. Upon completion, parents received a $10 gift card of their choice to Target, HEB, or Amazon.

Qualitative Study Recruitment. Most parents were made of aware of potential selection for interviews when contacted to complete post-intervention questionnaires. The selection of parents to participate in the qualitative interviews were a result of purposive sampling to gather a mix of parents with higher levels of engagement (e.g., parents with an average text response rate higher than 50%) and parents with lower levels of engagement (e.g., parents with an average text response rate of 40% or lower). While contacting parents, research assistants encountered some difficulty with recruitment due to lack of updated contact information on file which resulted in an unequal distribution of high vs low responders. For parents that were difficult to contact, research assistants consulted CIS leads at schools for updated contact information and/or conducted home visits. Two parents that were classified as 'high responders' according to the study's cut-off declined participation due to limited availability. Parents that agreed to participate in the interview were re-consented to provide greater information regarding their participation in the interview. Once consented, parents were asked nine open-ended questions in their preferred language (i.e., English or Spanish; see appendix for each interview guide) in an effort to determine factors that influenced their degree of engagement in the mHealth components. Parents had the option to complete the interviews in either English or Spanish, through a home-visit or phone interview. All

interviews were audio-recorded utilizing a digital voice recorder. Parents were compensated for their participation in the form of a $20 gift card to HEB or Target.

Intervention protocol. Act and Adapt is an evidence-based intervention for youth between the ages of 10-14 at risk for depression. Originally adapted from the Primary and Secondary Control Enhancement Training (PASCET) depression treatment manual (Bearman & Weisz, 2009) and later adapted following implementation in NYC public schools. Act & Adapt provides youth with video-guided examples of coping skills (i.e., problem solving, relaxation, behavioral activation, and cognitive restructuring) to respond to life stressors and improve negative mood and behavior (Eiraldi et al., 2016). The intervention protocol allows for flexibility in its utility to introduce coping skills that are relevant to current stressors in their lives. The video vignettes follow three racially/ethnically diverse teenagers — Sue, Juan, and Yvette, as they apply these coping skills to various life stressors. By incorporating major life stressors that are relatable to children and teenagers and showcasing racially/ethnically diverse teenagers demonstrating how to cope with these life stressors, Act & Adapt seeks to reduce a major barrier to care that has been demonstrated in previous literature —cultural relevance of an intervention which assists in increasing levels of acceptability in African American and Latinx populations (McDonald et al., 2006). Additionally, rates of depression in African American and Latinx youth, regardless of gender, are higher than same-aged White peers (Le, Tov, & Taylor, 2007 & Suarez-Morales & Bell, 2006). Yet, rates of access to care remain low in both groups (Gary, 2009; Williams & Jahn, 2017) unless services are provided in a school-setting (Alegria, Vallas, & Pumariega, 2010; Atkins et al., 2006).

Act & Adapt helps to address this disparity through its development for dissemination in schools in group-based sessions that meet once a week over the course of an average of 20 weeks across each of the three schools for 30-minute sessions. The current study disseminated Act & Adapt in three middle schools and groups were facilitated by one CIS leader at each middle school along with one graduate research assistant. When a student was absent from school the week of group, that student was provided a make-up session where they received a summary of the skill content their peers received in group that week. This intervention naturally addresses a mHealth concern of providing simulated examples of intervention content as addressed by Atkinson and Gold (2002), given that parents in the current study can view the same guided videos their children watch during group.

Text message protocol. During initial phone contact, parents were informed about the weekly text messages, which consisted of the following information: overview of the content covered in their child's group that week, a link to the study's website where they could watch videos containing the exact content their children viewed in group, and a prompt to rate their child's mood for the week on a 1-10 scale, (e.g., 1 being a "very bad mood" and a 10 being a "very good mood"). At the time of this phone call, research assistants also determined cell phone accessibility for each parent by directly asking for a cell phone number that could be used to send and receive study related text messages. Each parent was able to provide a cell phone number for the purposes of the text messages. Login information to the study's website was also provided during initial

phone contact, in addition to the telephone number that distributed the weekly text messages.

Text messages were sent on a weekly basis following each of the group sessions. The initial text message parents received included their first name in the introduction of the message along with the name of the researcher distributing the text message (e.g., *Hello XX, this is XX on behalf of the coping skills group. Today in the Act & Adapt group…"*). This initial text message was structured based on guidelines to help improve participant response rates and engagement by tailoring the text to the specific target audience (Atkinson & Gold, 2002). Subsequent text messages distributed to parents did not receive the same level of tailoring. Parents did not receive a text message on the week in which their child was absent from the group. One month into the commencement of the school groups, all parents received a follow-up phone call to ensure the receipt of text messages and to address any technology concerns related to receiving/sending the text messages and accessing the group's website. A similar phone call was provided to parents midway through the groups by research personnel. Following the conclusion of groups, parent text response rates were calculated and reported as percentage of responses received to texts sent by the research team.

MEASURES

Caregiver demographic background Caregiver's background information, including ethnic/racial background of the child's mother and father, caregiver employment status, educational level, and household income will be collected through this questionnaire.

Expectations for group outcomes scale (EGOS-P). The EGOS-P is a 7-item measure designed to assess whether information provided to the caregiver prior to the start of the group influenced their outcome expectations. (E.g., How do you expect your child to behave or act at home or school when the group is over; What change do you expect in your child's problems by the end of the group?"). Participants respond to a 9-point Likert scale (1=*much worse*, 9=*much better*). EGOS-P is not a validated measure but was developed utilizing related validated measures (e.g., Credibility/Expectancy Questionnaire; Devilly & Borkovec, 2000) that indicate high internal consistency (i.e., 0.81-0.86). Reliability statistics were conducted for the EGOS-P measure utilizing the current study sample, and high internal consistency reliability was found (Cronbach's α= .93).

Neighborhood characteristics. Data from Social Explorer's American Community Survey (2018; a database that provides access to demographic information within the United States) was used to examine unemployment rates and median household income, at the block-group level. The American Community Survey collects detailed population and housing information annually regarding communities throughout the United States. Data at the census block level, which consists of 600 to 3,000 people, was used for the current study. Census block was coded according to participant's reported residential address. Distance between residential address and school (in miles) was calculated using Google Maps. Distance to nearest public transportation was measured in miles. Public transportation data provided by Google Maps offers live traffic data support that

integrates transit stop, route, and fare information based on directions entered into the server through partnership with several transit agencies (e.g., Capital Metropolitan Transportation) throughout a given city (Google Maps Content Providers website). For the current study, distance to nearest public transportation was calculated based on the availability of forms of public transportation in the vicinity of the participant's residential address. Once residential address was entered into Google Maps, transportation icons are populated (e.g., in the form of train symbol on the map) which helped to determine the availability of forms of public transportation in proximity to the address. Once public transportation information was populated on Google Maps, distance from residential address to the nearest form of public transportation (e.g., bus, train) was calculated in miles. For addresses in which public transportation information was not provided on Google Maps, this information was sought on public transportation agency websites (e.g., Capital Metropolitan Transportation, CARTS) and resources (e.g., phone contact with 311). Distance to the nearest public transportation option was entered directly into SPSS in the form of miles. Previous research and the Federal Transit Administration suggest measuring access to public transportation by distance in miles to the nearest form of transit, with a close proximity cut-off of .25-mile walking distance to a stop or station (Grengs, Levine, & Shen, 2013; Sanchez, Shen, & Peng, 2004). These variables were examined in an effort to provide objective information regarding parent engagement based on neighborhood characteristics and were also examined in conjunction with qualitative data provided by participants.

STUDY DESIGN

To answer the study's research questions, a mixed-methods research design was utilized. A mixed-methods design increases the scope and interpretation of a study's findings by incorporating supplemental data to provide a richer explanation of the results that cannot be attained through the main method of data collection (Tashakkori & Teddlie, 2003). As a relatively nascent research methodology (Creswell, 2017), mixed-methods design has exponentially grown in its utility in the field of psychology given its ability to increase the comprehensiveness of research (Tashakkori & Teddlie, 2003). Additionally, mixed-methods research allows for the researcher to draw from the strengths while reducing the weaknesses associated with qualitative and quantitative methods when used individually (Johnson & Onwuegbuzie, 2004).

The current study specifically used an explanatory sequential mixed-methods design to provide greater insight into quantitative findings through qualitative interviews. Explanatory sequential designs consist of two phases of research, where quantitative data is first analyzed, and the results guide the qualitative phase of data collection (Creswell, 2017). In the current study, mHealth data was initially analyzed and informed the development of open-ended interview questions. Purposive sampling for the qualitative portion of the study was used to help the researcher build upon quantitative findings by intentionally seeking respondents that yielded certain results or served as outliers. In the analysis section of the current study, the researcher first reports the quantitative results (i.e., mHealth data, SES variables) and then describe the interview data findings in the

form of themes. A more detailed explanation of the how the interview data extended the quantitative findings is addressed in the Discussion.

STATISTICAL POWER

Power analyses were conducted using G* Power. To detect statistical significance for two-tailed correlation analyses with a .5 or greater effect size and a power of .80, the sample size needed is 29. The sample size needed to detect statistical significance for a linear multiple regression model with two predictors with an alpha of .05 and an effect size of .15 is 68. Given the small sample size of the current study, I also examined effect sizes to determine the clinical significance (i.e., the size of the effect on outcomes) of findings, even for results that were not statistically significant at $p < .05$. Effect sizes are not dependent upon the *n* of a sample whereas statistical significance (*p* value) is heavily dependent on sample size (Sullivan & Feinn, 2012), therefore it can be challenging to establish a statistically significant small or medium effect size in small samples due to lower power. In the case of the current study, effect sizes were reported in addition to p-values to interpret the size of the effect (and the clinical significance), even if the effect did not reach statistical significance at $p < .05$.

DATA ANALYSIS

Descriptive statistics of demographic and treatment expectancy variables were calculated using SPSS Version 23.0. Percentile calculations using Microsoft Excel were conducted to examine parent text response rate across each school, examining the number of text responses received in proportion to the number of text messages sent each week. Online intervention content was directly downloaded from Google Analytics in the form

of a Microsoft Excel spreadsheet, and entered directly in SPSS based on number of website visits. Relationships between variables were calculated utilizing correlational analyses and factors predictive of parental involvement were analyzed through a hierarchical linear regression model. Finally, thematic analysis was used to analyze the qualitative interview data and NVivo 12 Mac software was utilized to assist in the transcription and organization of the transcripts prior to transferring the data into a Microsoft Excel Spreadsheet to initiate the coding process.

Research question 1: What are the rates of parent engagement with mHealth intervention content?

Testing research question 1: Text response rates were calculated in terms of percentiles by examining the extent of responses for each parent based on the number of text responses received compared to the number of text messages distributed to the parent. Website data was drawn directly from the Google Analytic website and calculated based on website visits each week when text messages were distributed. Method of completion for baseline and post intervention questionnaire measures was be coded into numerical values within SPSS (i.e., 1-over phone with RA, 2-completed individually via online survey link, 3-completed by home visit or via postal mail, 4-not completed). Descriptive statistics were conducted first.

Research question 2: Is there a statistically significant relationship between parent text response rates and socioeconomic status (i.e., annual household income and educational attainment)?

Testing research question 2: Correlational analyses were conducted to examine the relationship between text response rates and annual household income. Since educational attainment data captured through the demographic questionnaire (e.g., high school graduate, college graduate) was a ordinal/categorical variable, the relationship between parent text response rates and educational attainment was examined through a Spearman's rho correlation.

Research question 3: What is the association between neighborhood-level variables and parental text response rates?

Testing research question 3: Correlational analyses were conducted to examine the relationship between text response rates and neighborhood characteristic variables (i.e., distance from home to school, access to public transportation, neighborhood unemployment rate, and median neighborhood income).

Research question 4: Are parent reports of treatment expectancy and socioeconomic status associated with parental text response rates?

Testing research question 4: Correlational analyses was conducted to examine the relationship between text response rates and treatment expectancy. A hierarchical linear regression analysis was conducted to predict text response rate. Studies have suggested parent engagement to be related to the socioeconomic status of families involved in mental health services (Burnett-Zeigler & Lyons, 2010; Heinrichs, Bertram, Kuschel, & Hahlweg, 2005), therefore socioeconomic status variables (i.e., annual household income, educational attainment) was entered into the first step of the model. In the second step, the treatment expectancy variable was entered as the literature supports

that levels of parent intervention engagement are associated with their expectations for behavioral changes following intervention (King, Currie, & Petersen, 2014; Nock, Ferriter, & Holmberg, 2007), even for ethnic minority families from lower socioeconomic status backgrounds (Larson et al., 2011).

Exploring research question 5: The qualitative interview data was interpreted through inductive thematic analysis. Inductive thematic analysis is a qualitative approach in which themes are formed directly from the data as opposed to preexisting themes or concepts (Smith, 2015). To initiate the process of thematic analysis, the researcher followed each phase as outlined by Braune and Clarke (2006). The first phase involved transcribing each interview verbatim using NVivo 12 Mac software, and after transcription was complete the data were transferred into a Microsoft Excel spreadsheet to aid in the review and interpretation of the data. Spanish interviews were transcribed by a research assistant whom is a native Spanish speaker directly into Spanish. After all Spanish interviews were transcribed verbatim, interviews were then translated into English. Some concerns were discussed regarding direct translation of certain Spanish words and/or phrases (e.g., "ella prefiere estar encerrada") into English, and those translations were discussed amongst a larger group of bilingual research assistants until a consensus was met. Next, two research assistants read through each of the transcripts to re-familiarize themselves with the data and took notes to inform phase two of the process, which consisted of code generation. Each research assistant conducted line by line coding for each transcript, separately, and developed initial codes. Once the initial codes were developed separately, the researchers met to capture consensus on code names and

definitions. This phase of data analyses consisted of several meetings to address revisions of code names and definitions to ensure that each code was clear and consistent with the data. Once the codebook was finalized (see Table 1), two research assistants met together over the course of several meetings to code relevant text from all 15 transcripts. Research assistants met together to code transcripts as opposed to separately to resolve any consensus concerns at the time of coding. The next phase of the analysis involved theme formation. This step consisted of grouping codes with similar meanings into broader themes as an initial first step to creating overarching categories for grouping the data. All transcript data remains in this phase and was not discarded given the idea that themes may continue to evolve. The next phase consisted of the researcher reviewing and refining themes. A total of 10 candidate themes were formed given their clear representation of the data (see Table 7). The final phase involved creating clear definitions for each theme by reviewing prototypical examples from the data that helped to inform the theme's formation and using those examples to tell the theme's story.

Chapter 5: Results

Prior to running statistical analyses, it was determined that questionnaire data were missing for several research participants, therefore a multiple imputation was conducted. Multiple imputation is a technique that assists in replacing missing values in a dataset with two or more acceptable values representing possible distributions pulled from the dataset and reproduces variance/covariance (Rubin, 2004). The number of overall missing case values in the dataset were 13, and therefore 13 separate datasets were created using a random draw of estimations from the distribution of the source population. Next parameter estimates and *m* was analyzed in the dataset and combined for inference. After this step, correlation and regression analyzes were conducted and interpreted below.

The total sample consisted of 34 African American and Latinx parents/caregiver (see Table 2 for select demographic characteristics). Participating parents were primarily women/mothers (*n*=31) while the remaining sample consisted of fathers and one grandparent. Nearly all parents were born in the United States (*n* = 18) while three parents reported being foreign born and from Latin American countries (e.g., Mexico). 67% of the sample reported being English speakers, and the remaining sample identified as monolingual Spanish speakers. Over 50% of parents (both mothers and fathers) reported attaining only a high school education or less. Almost all parents worked at least part-time (*n*=12).

Table 3 provides text response rates for all participating parents based on the number of text messages distributed compared to the number of responses received. 10 of

participating parents were considered high responders to the text messages, indicating that they responded at least 50% of the time (26% of the sample), while the remaining participants were categorized as low responders, indicating that they responded 40% of the time or less (*n*=24, 74%). Rates for method of completion of baseline and post intervention questionnaires are displayed in Table 4. Over 70% of participating parents opted to complete their baseline questionnaires through some form of technology (i.e., over the phone with a research assistant or via survey link sent through text message or email), while the remainder of the sample completed their questionnaires through home visits (*n* =3) or did not complete the questionnaire (*n* =4). For post-intervention questionnaire completion, 47% of the sample elected to complete the questionnaire over the phone. 33% of parents requested to complete the questionnaire independently online using a survey link either emailed or texted directly to their mobile phone. The remainder of the sample either completed the questionnaire using a hardcopy form through a home visit or postal mail or did not complete the questionnaire (see Table 4). Next, intervention website data was examined. After examining Google Analytics, the report determined there were no visits to the website throughout the duration of the intervention.

CORRELATIONAL ANALYSES

Parent text response rates and socioeconomic status (Research Question 2).

To test research question 2's hypothesis that there will be a statistically significant positive association between text response rates and socioeconomic status (i.e., annual household income and educational attainment) a Pearson's correlation was conducted to examine the association between text response rates and annual household income. This

correlation was small, negative, and not statistically significant (r=-.14, p =.49). In order to test the association between text response rates and educational attainment, a Spearman Rho correlation was conducted, and the correlation was small, positive, and not statistically significant (r=.22, p =.25).

Neighborhood-level variables and text response rates (Research Question 3). To test research question 3's hypothesis, Pearson's correlations were conducted. The correlations for this research question were not statistically significant (see Table 5). More specifically, the association of distance between home and school and parent text response rate was small, negative, and not statistically significant (r=-.05, p =. 78). The association between public transportation accessibility and parent text response rate was small, negative, and not statistically significant (r=-.01, p =.95). Lastly, the association between neighborhood median household income and parent text response rate was positive, small, and not statistically significant (r=.06, p =.74) and the association between neighborhood employment rates and parent text response rate was small, negative, and not statistically significant (r=-.06, p =.73).

Treatment expectancy and text response rates (Research Question 4a). To test research hypothesis 4a that parental treatment expectancy will be positively correlated with test response rate, a Pearson's correlation was conducted. The association between parent treatment expectancy and text response rate was small, positive and not statistically significant (r=. 19, p =.30).

REGRESSION ANALYSIS

Treatment expectancy, socioeconomic status (i.e., annual household income, educational attainment), and text response rates (Research Question 4b). To test hypothesis 4b, a hierarchical regression analysis was conducted to examine whether parental treatment expectancy will be positively associated with text response rates after accounting for annual household income and educational attainment. Annual household income and educational attainment were entered into the first step, and treatment expectancy was included in the second step. The final model was not significant F (3, 24) =1.00, p=.41, R^2=.11 (see Table 6). At step 2, the indirect association of treatment expectancy was also not significant (b=47.71, SE=30.67; CI [-15.58, 111.01]).

THEMATIC ANALYSIS FOR QUALITATIVE INTERVIEWS

To explore research question 5, a thematic analysis of the interview transcripts was conducted and revealed 10 themes: (a) transportation accessibility: both personal and public forms of access; (b) parental characteristics affecting interactions with systems in the child's life; (c) recognition of benefits to school involvement (d) cell phones: a way of increasing social engagement; (e) literacy levels and interactions with society; (f) economic factors impeding involvement with systems; (g) community: a resource to families; (h) networks in the community; (i) supporting parents to support their children; (j) personal experiences with mental health concerns: a gateway to knowledge. Each theme highlights factors that impacted parents' engagement with their child's school, the intervention, and related systems and services. Some of the themes naturally relate to one another (see Figure 1) and their relationships will be explored further in the discussion. Each theme is discussed in depth below.

Transportation Accessibility: Both personal and public forms of access.

Almost every participating parent mentioned transportation accessibility as a factor of engagement with services in their community. Parents explicitly mentioned that having access to transportation to travel to and from their child's school greatly contributed to their level of involvement. For example, one African American mother that responded 50% of the time to the text messages discussed at length about how she recognized the importance of being involved in her child's school to help foster academic achievement, yet she also mentioned that transportation accessibility makes it harder for her to be as actively involved as desired: "Just transportation wise…I mean usually I just get the city bus and be there you know like... but just the transportation is what keeps me [from being involved]. If I can't make it, it's because of transportation." This parent's comment was echoed by several parents in the study. Parents that live in the city often discussed the general availability of public transportation (e.g., buses) however affordability of public transportation and barriers were discussed in tandem as preventing access. Parents discussed a desire to use public transportation, but language and economic factors that inhibit the use of this service despite availability, which often interferes with their ability to attend school events. As one Latinx Spanish speaking mother described, "We don't have time to pay daily to take the bus… I get embarrassed to ask [for help with riding the bus], I am not going to ask them because I don't even speak English." Parents who owned vehicles reported greater involvement with their child's school and services in the community compared to parents with limited transportation access, for example a high responder Latinx mother shared "I am always going around the school to see how she is

doing, always pop whenever she don't think that I am not there, I am there." Living in communities that are solely motor vehicle dependent also limits access to resources in the community, and often parents have to rely on rideshare companies (e.g., Uber, Lyft) or ask neighbors for rides.

Parental characteristics affecting interactions with systems in their child's life. A reoccurring sentiment expressed by parents that also determined levels of engagement with systems in their child's life was personal characteristics or attitudes toward certain systems. Within this theme, three major factors were discussed: distrust of systems and within the distrust of systems, there was also a discomfort with the child's school, and parent educational background. A parent's distrust of systems in their lives was strongly related to bad past experiences. One African American mother who was a low responder (i.e., she only responded 6% of the time) discussed her distrust of schools due to past interactions with school personnel and issues at the school, "Where parents and teachers can actually take the time out and, well, the teachers need take the time out to learn the students… the lack of communication and the really non-experienced teachers, it could be better." Similar comments were coupled with general discomfort with the school system and was mostly described as personal feelings and attitudes toward schools that limit interactions. For example, another African American mother who was a low responder shared how she has always been uncomfortable in school settings due to being shy, "Well, let's see when she was going to [school] they had this program that where if the parents could come up and you know join in talk and all that. Me, I'm not that type of person because for one, I get nervous. I'm very shy when it

comes to people. I have always been that way since I've been in school and I'm not even in school and I get nervous about school." Some parents also discussed their degree of educational attainment and related literacy levels as limiting their involvement. For example, a Latinx mother that responded only 16% of the time shared how her lower literacy levels reduce her school support and involvement with her son, "I'm only able to help him with very little because you see that I do not have much schooling so because of the grade he is at, I can't help him much."

Recognition of benefits to school involvement. Recognizing the benefits of their own involvement with schools appeared to be a driving force for several parents that discussed active involvement. Involvement in schools have been consistent with previous literature, such that parental involvement consists of direct school involvement (e.g., attending parent-teacher conferences, volunteer work), home involvement (e.g., providing the child with encouraging statements regarding school, assisting in school work completion), or a combination of both. One high responder African American mother shared her acts of school-based involvement by stating, "I do a lot of volunteer work down there and mentor with them like, uh, she's in CIS, so whenever they have like trips and stuff I try to go with them." Involvement in the current study was discussed as being limited due to a lack of understanding regarding the role they would have as a parent in the intervention, as expressed by one low-responder Latinx mother, "Well I really didn't have many, like a lot of ways of participating [in the intervention] I receive calls to answer questions and texts in regard to how I've seen her improve but this is the first time I really met with somebody." One high responder Latinx mother spoke about

this idea of dual involvement, mentioning how she tries to have an active role both at home and at school, “I'm involved in everything, their activities, their sports, communicating their homework to teachers, like they call me if they missed a homework assignment, they'll call me the same day. Yeah, I'm pretty much involved with all their schools. Just be supportive of them, and when they need me to talk with them I sit here [at home] and we talk and they pretty much resolve everything, so school is going good.” The idea of receiving support to address their child’s emotional and behavioral concerns was discussed by almost every parent, regardless of their level of text message responsiveness, as a primary reason for involvement at their child’s school and/or the coping skills intervention group. For example, an English-speaking high responder Latinx mother shared, “Well I felt good that she was in a group because I wanted to think that it was helping her some way become involved or be a part of something.” These promising outcomes were discussed as positively impacting child and family coping skills as well as improved parent-child communication. Lastly, a sense of obligation and responsibility was also discussed by some parents as fueling their school involvement, a African American low responder mother stated “I make it my business to be there when they say she's got a problem and somethings going on and she's acting out and she got in trouble or she insists she ain't had no business, when they call me, I’m checking it.” This obligation or responsibility was also discussed by a few parents as it pertained to their responsivity to the intervention’s text messages, even by parents who were classified as low responders. For example, a Latinx English speaking mother that only responded 28% of the time shared, “I think it was more like my responsibility for me to answer them [the

weekly text messages], because even when you are home they ask how [the child] is, how [the child is] even outside school so I like that."

Cell phones: a way of increasing social engagement. A parent's cell phone use influences their ability to have social interactions, specifically through means of technology. Cell phone use is greatly impacted by a parent's cell phone literacy and cell phone coverage. Parent's responsivity to intervention text messages was linked to parent's overall cell phone usage as shared by a high responder English speaking Latinx mother, "They [the research assistant] would send me a text, I will get back as soon as I can like the same day pretty much, probably like a few hours after the text, but I would get back the same day. It was pretty easy to rate from 1 to 10 for me. I think that was what made it easier, you know, because it gave you the option, plus I'm always on my phone."

A lot of parents also described their cell phone use as a means to connect with the world, ranging from applying for jobs to talking to family members in other countries. For example, a Spanish speaking Latinx mother that responded to the study's text messages 33% of the time stated, "Well, I use the cellphone to communicate with families around the country and so to communicate with them, my husband, and my children. With the schools and everything to do with my children, appointments, doctors, what do I know, friends, and well Facebook, WhatsApp, and all that." However, when cell phone access is inconsistent, it is often more challenging for parents to remain in contact with many different systems (e.g., their child's school) which also affected their responsiveness to the text messages. A low responder Spanish speaking Latinx mother

spoke to her experience with inconsistent cell phone coverage affecting her responsiveness to the text messages “It is just that I have had a lot of phones. I think that you all were sending them [text messages] to different phone numbers.”

Overall, parents described receiving the intervention-related text messages in positive terms, and that it helped them to feel more engaged and aware of their child’s involvement in the group as shared by a low responder African American mother, “I liked that they kept, they kept being, you know, being persistent with seeing how she was doing like with the text messages like, um, checkup kind of sort of. I was able to see hands on how she was progressing I guess.” Yet, almost every parent regardless of their level of responsivity described having no access to the intervention’s website. For high responders, there was no explanation provided for lack of engagement with the intervention website, for example a African American mother who responded to 67% of the study’s text messages stated, “Honestly, I never went to the website, I would just see it and read the messages, but I never opened it. I never opened the link. I never opened in to see more information.” While a Spanish speaking Latinx mother who responded less frequently to the text messages attributed this lack of engagement to technology literacy, “It was hard for me because I don't, I'm not familiar with internet and all that.”

Literacy levels and interactions with society. Above and beyond their educational attainment, minimal technology literacy was reported as being directly related to reduced social interactions and engagement with intervention materials. Parents with limited technology literacy regarding how to utilize the various functions on their cell phone discussed issues with accessing the intervention’s website, a Spanish-speaking

Latinx mother that responded 13% of the time mentioned, “Well in reality I don’t know how to use the computer or the web or the email, none of that.”

Parents who did not understand how to access internet websites on their phone also described using their cell phone only for basic functions, such as sending/receiving text messages and making/receiving phone calls. In describing limited technology literacy, parents also discussed confusion with intervention related text messages. The confusion was not a result of their inability to respond to a text message but was described in terms of their overall reading literacy and understanding of the text messages as shared by a monolingual Spanish speaking Latinx mother that responded to none of the text messages, “I don’t know how to read or write very much, but my children try to teach me how to send texts, receive them, and answer them.”

To address confusion with text messages and limited technology literacy, parents offered the suggestion for phone call check-ins. For example, a low responder African American mother shared, “I don't like websites period. I like talking to people so I will never have an understanding with the internet because I hate it. I think it's better if they were to just pick up the phone. I just don't like the online. I hate computers, I hate technology, I really do.”

Economic factors impeding involvement with systems. This theme includes three socioeconomic factors that impeded parents’ involvement either with their child’s school or with community services. One Latinx mother that responded only 25% of the time to the text messages specifically described low socioeconomic factors as directly reducing her school involvement due to the daughter’s embarrassment of the family’s

finances, “Getting involved in her school things…. well I do not. There was a time where she was embarrassed of the car that I had, the house where we lived, and she was like very preoccupied with material things so she was like I don't want anyone to meet my family, or my mom, or anyone because of our level of life that we have… she prefers like that her friends don't know or the teachers or anyone.”

Families with reduced economic resources also discussed reduced access to community services due to concerns of affordability. A few parents specifically described that being considered low-income was a major deterrent to receiving behavioral health services to address mental health concerns. A high responder Latinx mother shared her personal experience working for a community mental health facility and the concerns of insurance coverage, “I mean I worked for community care so I know about integral care so I know there's um, the mental health place over there. I think there's a new one on Riverside. So I know they're available but I still think it's all about money and your insurance.” Parents that reported greater economic concerns also reported greater work constraints due to long work days that reduce their ability to be actively involved in their child’s life, for example “I sometimes work seven days; I occasionally have a day off. Sometimes I take days off because I have things to do because I am a single mother and I have rent to pays, bills and everything,” as shared by a low responder Latinx mother.

Community: a resource to families. Views of one’s neighborhood in terms of its resources was commonly discussed by parents. When asked to define their community, parents often described businesses and corporations as resources, such as HEB (a grocery store), fast food places, and doctor’s offices. “Well, we have an HEB and

you got a clothing store up a little further. That's why I kind of like this area." While describing one's community, parents also discussed at length resources that would be considered more informal and unique to their community that serve as a resource to address basic needs. For example, a low responder African American grandmother/caregiver shared, "I've lived in apartment complexes in the past where they would have, you know, have commodities and stuff, even to the elderly. I know they give the kids, in the summertime, they give them lunch and I think they give them lunch and breakfast." Some parents also discussed their community and its resources in terms of the church they attend. The church was described as connecting families to both these formal and informal services that might not have been known otherwise, "I know that there is a church right here down the street that they say you can walk in and talk to anybody you want in the church if you feel like you need to hurt yourself," a low responder African American mother mentioned.

Networks in the community. Similar to one's community being described as a resource, parents described their community in terms of their networks. Networks in the community were described in different forms. For example, one low responder Latinx Spanish speaking mother described forming amicable but distant relationship with neighbors and viewing them as part of her community, "Good, I do not talk with anybody. Hello, good day, or goodbye or like that but I do not involve myself like putting myself there or inviting them or just that. No, well I also do not have problems with them or anything, we just talk a greeting and that's it."

Some parents describing having/forming strong relationships with neighbors due to viewing these individuals as close to the family unit or being part of their family. For a few parents, their neighbors were also consulted for advice or knowledge. For example, a Spanish speaking Latinx mother who responded to text messages 73% of the time shared, “I talked to my neighbor about my daughter and she told me about People's and now I take her there because of that friend.” However, these close relationships for some parents were very dependent upon culture relatedness (i.e., neighbors speaking the same language, being part of the same cultural/ethnic group). Another Spanish speaking Latinx mother discussed, “I do not speak English, the girls here in the front are Mexicans and with them it’s good morning and good afternoon, but there are also Mexicans and we get along well and we communicate well.”

In contrast, there were a few parents that described having no contact with neighbors and considered networks to be exclusively their immediate family. A low responder Spanish speaking Latinx mother stated, “I am always here at home with my kids and my family sometimes visits me, I talk with them. I am not very friendly.” Lastly, church involvement was discussed as a network for connecting parents to other families in the community. A low responder African American mother spoke specifically about her church network, “I think with the church people. We go to church. When we get together, I think that's a community because when you are working you are always talking about everything, even if you feel something in your head you are gonna tell them oh I got this.”

Supporting parents to support their children. Parents expressed ways in which they desired to be more supported in the coping skills intervention group and ways they currently feel supported by their child's school. While describing support and connection to mental health resources, parents mentioned that they were often connected to those resources by their child's school. For example, an English speaking Latinx mother who responded to 100% of the text messages shared her connections to resources through her child's school, "Services, well like counselors in the children's schools, another one is the clinics the school mentioned to us, like CommuniCare, they offer mental health services there. Also, the school. Well I think that counselors are good because they help with that."

Parents also shared two ways that could have improved their involvement in the coping skills intervention group: face-to-face parent groups and in-person parent involvement opportunities. Parents that expressed a desire for face-to-face parent groups typically described that they wished they received a separate group solely for parents to attend where they could connect with other participating parents with children experiencing similar concerns. A English-speaking Latinx mother that responded 66% of the time shared her preference for a parent group component, "Just one meeting towards the end, you know so that that way you can see like all the kids, how many kids are really affected by this, you know as a parent you like okay she meets one on one with my kid, but is there any other kid that's experiencing something like that." Other parents discussed a desire for in-person parent involvement in terms of physically attending the group and observing their child. For example, a low responder African American mother

shared her desire to witness her child's progress by attending the weekly groups, "I would have liked to see exactly what she's doing and then I could've watch her progress. To know what's been going on instead of just what she was saying."

Personal experiences with mental health concerns: A gateway to knowledge. When parents were asked to describe their understanding of mental health and related resources to address the concerns, most parents described personal experiences with services in the community as a source of knowledge. For example, a high responding English speaking Latinx mother shared her experience with mental health services for her family, "Um, well I've done like a lot of counseling with my kids, I've been in counseling a lot, so I think it's, uh, all pretty similar. Um, with different... depending on like what you want help with, what you need, uh, what you need to work on you know." When parents did not have personal accounts to share, they described some level of mental health awareness or literacy, but often did not know where to seek services. For example, one African American mother that responded 6% of the time to text messages shared, "I know that they're... they're available in the community. I just don't know anybody and haven't had any use for them so far in my life."

Chapter 6: Discussion

The objective of the current study was to examine parent engagement in a mHealth component of a school-based intervention, as well as factors related to engagement. Previous research indicates that using technology platforms to maximize the dissemination of information between home and school not only supports engagement but also demonstrates eased utility (Lewin & Luckin, 2010). In the current study, the use of text messages as a parent intervention engagement tool demonstrated mixed outcomes. While the mHealth (text message) component helped to encourage engagement in roughly 30% of the study's sample, more than half of the sample demonstrated overall low engagement with the intervention. Parents provided reasons for reduced engagement during the qualitative interviews.

Parents categorized as 'low-responders' (i.e., 74% of the study's sample) reported more engagement barriers compared to 'high-responders.' Limited technology literacy was a primary factor related to reduced engagement. These results are not surprising, particularly when examined alongside the method of completion for pre- and post-intervention questionnaires. A large percentage of the sample opted to complete the questionnaires over the phone (36% for pre-intervention questionnaires, 47% for post-intervention questionnaires) as opposed to completing the questionnaires individually via the survey link. Parents who reported difficulty accessing online intervention material (e.g., intervention website, survey questionnaires) also discussed the idea of using cell phones for only essential purposes (e.g., to place phone calls, send text messages). These findings diverge from much of the current literature on mHealth, which suggests an

increase in cell phone literacy and use amongst lower-SES populations (Hauge, Chiang, & Jamison, 2009). The current results suggest that parents with lower technology literacy may benefit from in-person demonstrations of the intervention's technology components and ongoing technical support to fully access the mHealth components.

Alongside limited technology literacy, inconsistent cell phone coverage was also discussed as a factor for reduced involvement. In 2016, the U.S. Department of Housing and Urban Development (HUD) distributed a nationwide survey to examine technology access inequities in low-income households and results revealed that low-income households (i.e., households with an annual income of $25,000 or less) have inconsistent internet and mobile device access due to costs (Insight Policy Research, 2018). Inconsistent cellphone access may explain why some parents had limited responsiveness to the mHealth component. Although the current study attempted to ensure all participants had cell phone access during an initial contact to study participants, our results suggest that cell phone access may need to be assessed (and provided) continuously in low-income populations receiving mHealth interventions.

Research question 2 examined the relationship between parent text response rates and socioeconomic status (i.e., annual household income and educational attainment). While these factors did not have a statistically significant association with text response rates, there were small negative effects for the association between educational attainment and text response rate (r=-.22), and annual household income and text response rate (r=-.14), suggesting that SES and related systemic factors may have a small but meaningful impact on parents' ability to engage with mHealth intervention content.

Specifically, it is possible that educational attainment is related to technology literacy or general literacy, such that parents with lower education levels may have more difficulty navigating technology components (e.g., the mechanics of sending texts) or reading and understanding the content of messages. Similarly, household income may be related to work flexibility, such that lower-income parents may have more demanding jobs that reduce mobile device access throughout the workday. This interpretation is consistent with the qualitative findings, in which parents with longer work hours have less cell phone access during their shifts. These findings are consistent with previous literature showing a relationship between socioeconomic factors, particularly work schedules, and parent engagement in child mental health services (Li et al., 2014; Murray et al., 2014; Waanders, Mendez, & Downer, 2007). The current findings highlight a need for further input from parents regarding ways in which they prefer to be engaged in mHealth components of mental health interventions while also balancing competing priorities (e.g., work). For example, parents might indicate the time(s) of day when they would prefer to receive texts so that communication with providers is tailored to their availability during the day.

Research question 3 examined the association between transportation variables (i.e., the distance between home and school, public transportation accessibility) and text response rate. The correlational analyses indicated that there was not a statistically significant relationship between these variables and parent text response rate, and that effect sizes were close to 0 (*r's* of -.01 and -.05). During the qualitative interviews, parents discussed how transportation barriers strain their in-person school involvement,

even when public transportation is accessible (i.e., because of the affordability of public transportation). Yet, parents did not cite any transportation concerns pertaining to their involvement with the mHealth component of the intervention. Therefore, it is possible that involvement in mHealth components of a school intervention may not be affected by transportation access and text messages might be a promising approach to engage parents in mental health-related services in the presence of transportation barriers.

The relationship between text response rate, median neighborhood household income, and neighborhood unemployment rate was also examined in research question 3. Previous research has shown that families living in socioeconomically disadvantaged neighborhoods demonstrate inconsistent engagement with systems of care and related resources in the community (Chow, Jaffee, & Snowden, 2003; Kirby & Kaneda, 2005). However, the current correlational analyses showed that median neighborhood household income and neighborhood unemployment rate were not significantly correlated with text response rate, and the effect sizes for each correlation were small (r=.06 and -.06, respectively). This result suggests that neighborhood SES is only minimally related to engagement in mHealth intervention components, and might be a more relevant approach for engaging families in low-resource neighborhoods.

Neighborhood characteristics were further expounded upon during the qualitative interviews. Most parents described their neighborhood in the context of resource availability. When more traditional mental health resources were absent, parents described utilizing free ‘informal community resources’ offered by apartment complexes or churches. Such resources often aided in the formation of ‘collective units' (i.e.,

individuals considered close to the family) or amicable relationships with other community members. The formation of these informal resource networks has been documented for both African American and Latinx populations (Campbell & Lee, 2018; Dressler, 1985; Winters, de Janvry, & Sadoulet, 2001). Further, help-seeking behaviors for mental health concerns may occur through these informal networks (Caughy et al., 2003; Gary, 2009; Harrison, Wilson, Pine, Chan, & Buriel, 1990; Hue, Snowden, Jerrell, & Nguyen, 2011). Consistent with this literature, the current study's findings indicate that social networks in low-income communities of color could facilitate mental health service engagement; therefore, systems providing care may benefit from accessing these networks to share information amongst community members.

Research question 4 examined the association between treatment expectancy and text response rate. Correlational analyses indicated that parents' baseline report of treatment expectations were not significantly associated with parent text response rate. Nonetheless, the effect size for the relationship between these two variables was small and positive (r =.19), and after controlling for annual household income and educational attainment, the relationship was nonsignificant with a medium effect size (R^2=.11). These results suggest that parents' initial reports of their expectancy for the intervention are modestly related to their level of mHealth treatment engagement. This finding is consistent with previous literature that suggests that parental expectations before seeking treatment are a motivator for engagement (Larson et al., 2011; Stevens et al., 2009).

Examining these quantitative results in the context of the qualitative interview data further helps to elucidate the relationship between treatment expectancy and

mHealth engagement. The qualitative findings highlighted that 'high-responders' felt compelled to respond to the text messages because they anticipated positive behavioral/emotional changes in their children following intervention engagement. Further, they described the role noticeable improvements in their children's coping skills played in their engagement with the weekly text messages. While prior research has found that expectations for improved behavioral outcomes have been associated with increased parent participation in clinical settings (Chacko et al., 2012), the current results are some of the first to generalize this finding to mHealth and school-based mental health intervention.

Finally, qualitative findings also highlighted ways to improve parent engagement in the mHealth component of the intervention. Some parents shared a desire for in-person involvement as a way to better engage with the intervention. Parents requested opportunities to attend the group in person occasionally to promote greater understanding of the group's purpose. Similarly, parents described a desire for a face-to-face parent group as opposed to the text messages alone. While most participants described the text messages as beneficial in conveying information, parents with children experiencing more emotional or behavioral difficulties desired an ability to connect with other parents that were enduring similar experiences.

As previous research has shown, in-person components of child mental health interventions demonstrate success in increasing parental self-efficacy (McDonald et al., 2006), but are not always feasible because of parental work constraints or transportation accessibility difficulties (Bull, Krout, Rathbone-McCuan, & Shreffler, 2001; Heinrichs,

Bertram, Kuschel, & Hahlweg, 2005; Yeh et al., 2005). Nonetheless, it may be that the subset of parents who are already actively involved in different areas of their child's life would be able to overcome these barriers and demonstrate higher levels of acceptability and engagement with in-person parent intervention components. However, for parents not actively involved, an in-person parent component could further promote engagement disparities. The possibility for other forms of contact (e.g., phone calls, home visits) for low-responder parents may be more appropriate as a way to increase and maintain their engagement.

STRENGTHS AND LIMITATIONS

One of the strengths of the study was the mixed-method design. The use of qualitative data to expand upon quantitative findings supported areas of growth in the field. Another strength of the study was the focus on a mHealth component in a school intervention using an African American and Latinx parent sample. Previous mHealth interventions with youth of color have been limited to clinical settings (Aguilera, Schueller, & Leykin, 2015). Therefore, the current study adds to the field's understanding of the use of technology platforms to engage parents of color in school-based mental health services.

Despite these strengths, the current study has several limitations worth noting. Participants in the current study were recruited due to their child's existing involvement with the organization CIS at each school and the intervention occurred in a real-world school setting. The nature of this setting, although ideal for the dissemination of services, limited the ability to control for additional factors that could have influenced mHealth

engagement, such as the quality of parents' pre-existing relationships with the CIS providers at different schools.

The study's relatively small sample size (n=34) was also a significant limitation, particularly for the analyses. After conducting a statistical power analysis, the sample was underpowered to conduct a regression analysis or detect significant correlations that were smaller in magnitude. When a research study is underpowered, it is more challenging for researchers to detect statistically significant results accurately (Cohen, 1992). The current study instead relied on the examination of effect size as a result of being underpowered to assist in the interpretation of results, since effect size is independent of a study's sample size (Sullivan & Feinn, 2012).

The quantitative study's sample overwhelming consisted of mothers (94%) and self-identified Latinx (80%) and took place in central Texas. The demographic composition of the qualitative study's sample was similar. Given the sample composition in both studies, the results are likely not as generalizable to African American parents or to Latinx parents in other geographic regions. Also, past studies have suggested that father engagement in mental health services in clinical settings varies greatly from mothers (Cowan et al., 2009); thus the current results are limited in its generalizability to fathers.

Another limitation of the study was the limited number of constructs measured to conceptualize mHealth parental engagement. The questionnaires only captured demographic information (e.g., race/ethnicity, annual household income, educational attainment), and treatment expectations. However, these measures failed to capture other

factors that can play a critical role in parental engagement in mental health services, such as experiences of discrimination, feelings of trust or distrust in systems of care (i.e., school and healthcare systems), neighborhood cohesion, parents' social networks, literacy, and language fluency. Although the qualitative data addressed some of these constructs, collecting quantitative data on these other factors would have aided in a more comprehensive understanding of the factors related to parental engagement in the mHealth component.

Relatedly, the design of the text message protocol was another study limitation. Despite the text messages containing "plain language," which is a recommended strategy for improving the usability of mHealth literacy content (ODPHP, 2010), many parents experienced the messages as too long, and as not containing explicit action steps. Therefore, parental engagement may have been confounded with the related construct of parental literacy, and the current study was not able to examine these constructs separately.

CLINICAL IMPLICATIONS

The results of this study suggest that mHealth technology may help to foster parental engagement in school-based mental health services for some low-income African American and Latinx parents. During the qualitative interviews, many parents shared that the weekly text messages were a useful engagement tool. Yet, intervention research literature commonly highlights pitfalls associated with parental engagement. Thus, there are several strategies described below could be used in future research and

practice to improve engagement in mHealth components of school-based mental health interventions, particularly for low-income African American and Latinx parents.

Flexibility. A common theme discussed by parents related to their inability to fully engage with the weekly text messages in addition to other areas of their child's life due to various systems failing to accommodate low-income families. Some of the 'low-responder' parents reported difficulty in responding to the text messages due to the time of day they received the study's text messages. The time of day that text messages were sent conflicted with many parent's work schedules, which made it challenging for them to respond. This failure to respond, in the current study was classified as a lack of engagement. However, when discussing the study further with 'low responder' parents, they expressed willingness and desire to be engaged, but several factors (e.g., time of day message sent) reduced their capacity to respond to the texts. Therefore, future interventions with a mHealth component should discuss potential scheduling preferences with parents and tailor the timing of messages to parents' scheduling needs, in order to cultivate engagement opportunities for parents with higher work demands.

A plan for greater flexibility in mHealth parent engagement tactics would require intervention staff to work collaboratively with parents to garner their ongoing feedback throughout the intervention. This level of feedback could be gathered during bi-weekly phone calls with parents to discuss any challenges with the receipt of the text messages. By gathering this feedback and continuing to modify the time of day information is delivered based on the needs of families, parents would have more opportunities to engage with the mHealth content.

Literacy adaptations. Tailoring the content of mHealth information also requires adaptation to parental literacy level. Several parents discussed comprehension difficulties with the text message content or viewed the text messages as spam. Although the current study tailored initial text messages to parents, the same level of tailoring did not occur for subsequent text messages. Flexibility in the literacy level used to convey intervention related information is crucial, given the variability in health literacy and education level of parents. Often, tailoring intervention content to meet the needs of participants requires trial and error. Therefore, after parents receive their initial text message, providers could examine parent responsiveness to the messages and tailor subsequent messages to shorten their length and/or use less clinical jargon. Similarly, to help parents with lower technology literacy, a practice run of the technology component could facilitate increased engagement (e.g., sending parents a text message while on the phone with the parent, having parents log onto the website while on the phone with them). By incorporating in-person and technology practice/troubleshooting components in intervention, clinicians may notice an increase in overall engagement levels.

Cultural considerations. Although participating parents did not openly discuss cultural concerns, it is essential for mental health providers to account for cultural considerations when providing mental health-related services to African American and Latinx families. Based on previous research, there are several culturally salient strategies providers could use to enhance parental engagement in mHealth components of school-based mental health interventions.

Cultural considerations for African American families. To engage African American parents in school-based mental health services, Logan (2011) suggests that schools and organizations strive to incorporate African-centered values (e.g., unity of family and community, collective work and responsibility, and faith) into their practice. This could be achieved by mHealth content utilizing relevant images (e.g., of family-community interactions) and wording (e.g., sayings that reflect families' faiths or religious identities) that reflect these values.

The connection or "vibe" African American families receive from therapists or community providers has also been noted to play a role in therapeutic relationships and the acceptability of treatments and services (Boyd-Franklin, 2003). Thus, it is crucial for community providers to establish rapport before the start of services and make conscious efforts to maintain and strengthen these connections over time. Similar to in-person intervention approaches, rapport building could be built into mHealth intervention components by engaging parents in conversational texts prior to sending intervention information. It may also be important to incorporate regular in-person meetings, or video-chat technology, to strengthen and maintain rapport building.

Cultural considerations for Latinx families. Latinx families may also benefit from rapport building with service providers, particularly in a style that reflects Latinx cultural values. For example, *personalismo,* the emphasis on establishing trusting and warm interpersonal interactions with individuals (Altarriba & Santiago-Rivera, 1994), has been shown to be integral to parent engagement in children's mental health interventions (Barker, Cook, & Borrego, 2010). Schools and mental health providers can

implement *personalismo* in practice by stepping away from the 'expert' role and allowing families to have a space to voice their concerns that are unrelated to mental health. For example, parents may benefit from a support group component (either online or in person) that co-occurs with their children's coping skills group and includes communication from the school-based provider. Additionally, an important way to support engagement of monolingual Spanish-speaking Latinx parents is to deliver content in Spanish (Reidy, Orpinas, & Davis, 2011). To enhance engagement of Spanish-speaking parents, providers and systems of care should carefully consider the specific demographic backgrounds of Spanish speakers (i.e., country/region of origin) to tailor Spanish vocabulary and mental health content for familiarity and cultural relevance to parents.

FUTURE RESEARCH

The current study's findings have important implications for future research regarding the use of mHealth technology to foster low-income African American and Latinx parental engagement in school-based mental health services. Some recommendations include continued research utilizing mHealth methods in school-based mental health services, increasing the representation of demographically diverse African American parents and Latinx parents in study samples, and examination of additional constructs that may impact parental engagement.

Future research should consider conducting qualitative interviews or focus groups with parents before the implementation of any mHealth component as a form of parent engagement. Conducting qualitative research before the design of the mHealth

component would assist researchers in fully understanding their sample and the cultural considerations warranted to promote greater engagement. Collecting qualitative data before intervention could also help to inform the selection of quantitative measures utilized for the intervention and potentially yield more robust findings.

Additionally, expanding this study to a sample of African American and Latinx parents with varying demographics would be interesting. A purposeful sampling of participants with an emphasis on varying income levels, educational attainment, gender distribution (i.e., a representative sample of both mothers and fathers), and generational and immigration status could further expand upon current literature regarding African American and Latinx parents' engagement in mental health-related services and capture additional information relevant to cultural background.

Finally, future research should examine additional constructs highlighted by the current study's qualitative data. As discussed in the limitations, factors such as culture (i.e., parent's level of acculturation, cultural determinants of help-seeking), experiences of discrimination, perceptions of neighborhood quality, and presence and use of parents' social networks, would provide a more comprehensive picture of the factors that could potentially influence parents' engagement in mHealth school-based services.

CONCLUSION

School-based mental health services present an opportunity for many families to receive care that may otherwise be inaccessible. mHealth interventions seek to further reduce parental engagement barriers to school-based mental health treatment by disseminating information through technology platforms. The use of a mixed-methods

design in the current study offered a more in-depth picture of factors related to low-income African American and Latinx parent engagement in a school-based intervention using a mHealth component. Some parents viewed engagement in the mHealth intervention component as contributing to improvements in their child's functioning, and text messages helped many of these parents feel more involved in their child's progress. However, some parents with lower technology literacy or access appeared to have greater difficulty engaging with the mHealth component. Thus, these findings help to offer insight into the use of technology to engage low-income African American and Latinx parents in school-based mental health intervention.

Tables

General School Involvement		
Code	**Definition Criteria**	**Example Excerpt**
Discomfort with school	Feelings that inhibit interactions with school/school personnel.	*"I am not the one like I participate but I participate from a distance to where I would get something, you know, have her bring it or I'd drop it off, but as far as staying and doing activities and...mm-mm.....(Laughter) I have always been that way since I've been in school and I'm not even in school and I get nervous, so...."*
Low SES barrier	Refers to socioeconomic barriers and related emotions and behaviors prohibiting school involvement.	*"There was a time where she was embarrassed of the car that I had, the house where we lived, and she was like very preoccupied with material things, so she was like I don't want anyone to meet my family, or my mom, or anyone because of our level of life that we have, right. So, well, I feel that is one of the things that she prefers like that her friends don't know or the teachers or anyone."*
Parent educational background	Parents educational background or literacy levels impeding their ability [in their eyes] to have an active role in their child's schooling.	"I'm only able to help him with very little because you see that I do not have much schooling so because of the grade he is at, I can't help him much."
Access to transportation	Means of transportation availability to/from the child's school contributing to a parent's degree of involvement.	

Table 1: Qualitative codes.

Work constraints	Refers to work obligations that interfere with school involvement.	*"Work. (I: Work. Okay) I have work. I have long crazy hours and right now I am short-staffed, I'm the only one right now at my office, my shop. I try. I really do try, but it's just uh somebody has to be at (I: Mhm) work."*
Promising (child) behavioral/emotional improvements	Programs that influence or has the ability to influence positive child outcomes as a result of participation serve as a facilitator for parent involvement.	*"I do a lot of volunteer work down there and mentor with them like, uh, she's in CIS, so whenever they have like trips and stuff I try to go with them. Um, make sure I'm mostly there for anything that she needs help with, you know, especially with getting her signed up for programs to make her strong-minded, more to say so, every time they call me with something that'll help her come up out of her shell I'm there so it's more like that, more than just right there, right there."*
Parental responsibility/obligation	Refers to the belief that when events or activities occur at the child's school, it is the parent's responsibility to attend. This could be voluntary attendance or when it is mandated.	*"Well I, uh, sports events. I haven't been summoned to any meetings. I went to the uh 504, I did that last year. But you know when they call me and say they got one, you know, for me that I need to come and participate, I'm there, but so, I guess I don't know what I would put for as that. I participate when I'm summoned, but... and then I do participate because she's on the volleyball team"*
School-based involved parent	Refers to a parent that exhibits consistent school-based (e.g., attending parent meetings).	*"I always...emailing the teacher, I always going around the school to see how she is doing, always pop whenever she don't think that I am not there, I am there haha yeah."*

Table 1: Qualitative codes.

Home-based involved parent	Refers to a parent that exhibits home-based (e.g., help with homework, academic socialization) involvement.	
Dual involvement	Parents reporting both school and home based involvement	
Thoughts/perceptions of the Act and Adapt school group and the use of group material distributed to parents		
Code	**Definition Criteria**	**Example Excerpt**
Child coping skill development	Parents report an increase in coping skill use with their children as a result of participation in the school group, which motivated them to be more actively engaged.	*"Oh no, I felt like it was more likely for me to respond because I felt like it was helping her. So, yeah."*
Text messages as a check-up	Weekly text messages served as a way to check-in regarding the child's mood and progress. Helped parents feel involved.	*"Well the only thing I liked, I liked that they kept, they kept being, you know, being persistent with seeing how she was doing like with the text messages like, um, checkup kind of sort of. So, I was able to see hands on how she was progressing I guess."*
Limited technology literacy	Having a limited understanding of the various functions on a smartphone, reduced consistent interaction with text messages, but primarily the website link in the texts.	*"I do not know much about technology, so it takes me longer to use my phone."*

Table 1: Qualitative codes.

Parent-child communication	Refers to the belief that the messages served as a facilitator to hold more conversations with their child.	*"only to know what XXX had done and when XXX arrived I would ask her and I would tell her XXX, today they sent me a message about what happened and this is what it was about" and then she would tell me yes, today it was about this and they told us this and they she would talk to me about it and after she would put it in practice, mhm."*
Perceptual barriers in role	Lack of clarification from the start of the coping skills group to address the parent's specific role in the group.	
Family support/Family well-being/Family coping	Thoughts that the group would assist in the well-being of the entire family	
Responsiveness to messages	Stated that they responded to text messages	Responsiveness to messages
Confusion with messages	Were confused about the text messages they received and how to respond to the messages.	Confusion with messages
Parent-group limited contact	Contact limited between parents and group facilitators due to factors related to lack of receipt of text messages or inconsistent cell phone coverage.	Parent-group limited contact
No website visits	Parents did not visit the intervention's website.	No website visits
Website visit attempts		

Table 1: Qualitative codes.

Ways to improve parent-related information		
Code	**Definition Criteria**	**Example Excerpt**
Written forms of communication	Refers to the desire to receive more tangible forms of communication such as a handout or email as opposed to receiving a text message.	*"I would have preferred it in writing and pamphlet paperwork cause then on my free time when I'm waiting in between a job I could sit there and read it. When you're on the phone, you're trying to zoom it in you know trying to do this while another text message"*
Face-to-face parent groups	Providing parents with in-person groups or possibly even a one-time group dedicated to receiving information about the material their child is learning every week in the 45-minute coping skill group.	*Have groups involve the parents in them. Yeah, just to see it like towards the end."*
Phone call check-ins	Parents receiving more frequent phone calls from group/school personnel for parents who are not tech savvy	
In-person parent involvement	Parents have the ability to attend the group or observe what their child is completing/doing.	
Texts to bridge communication	Parents believe that receiving text messages were a helpful way to gain a better understanding of their child's school functioning and involvement.	
Code	**Definition Criteria**	**Example Excerpt**
Schools as resource centers	Information regarding community resources are made available to families by school personnel.	*"Yes there are many resources for help...there is a person who works here as a social worker and she can tell us where to find free food, help for rent, uh uh, in one occasion they gave her a bus pass and when the kids have good grades they also give them a 15-dollar gift card and that is all."*

Table 1: Qualitative codes.

Heterogeneous neighborhoods	Racial/ethnic segregation in communities.	*"They don't...everybody's separated here, you know...there are African American people over here, Latinx people over here, your Asians over here, your whatever over here, and they really don't...mix...they kinda keep them isolated."*
Culture relatedness	Interactions with neighbors driven by cultural connections.	*"Mmm, well I can't explain much because most of... you look around here I have Americans, I do not speak English, the girls here in the front are Mexicans and with them it's good morning and good afternoon, which is when we see each other in the mornings or just whenever, just some greeting and with a dark-skinned boy just hi or like that because I am surrounded by more dark-skinned people than Mexicans, because it is just the girls and further there are also Mexicans and we get along well and we communicate well."*
Collective unit	Neighbors are viewed as individuals close to the family unit. Everyone shares a role in offering support in different areas of one another's lives.	*"My community is pretty good. Well everybody knows each other around here. We all talk, say hi, we look out for each other. If the street's dirty, we'll pick up the trash, like it's a community around here. So... (I: Mhm) We have a neighborhood watch around here so everybody gets together, we communicate pretty good."*

Table 1: Qualitative codes.

Churches bridging social networks	Churches are viewed as a place that naturally offers the facilitation of interaction between people in the community.	*"I think with the church people. We go to church. My work, when we get together, I think that's a community because when you are working you are always talking about everything, even if you feel something in your head you are gonna tell them oh I got this."*
Churches as support	Churches viewed as a place that offers support that extends beyond connecting neighbors (e.g., a place to address mental health concerns).	*"Like church, they got mental health places down there too like uh where you can call, are you calling like 211 to get information, or is that 311, call 211. They got churches that help out with stuff like that down there."*
Informal community resources	Refers to basic necessities being met through services offered by the city, their apartment buildings, or related community organizations offer events to support the presence of these resources.	"The landlord will have educational things, as far as like for the children. There is sometimes food over there also. I'm blessed."
Formal community resources	Parents do not feel an obligation to leave their communities to access various resources (e.g., groceries, clinics) because those services are made readily available in their community.	*"Yes, there is a HEB…The clinicals are also close, there is one here by 11th street. There is a psychiatrist over here."*
Mental health awareness	Refers to being aware of what defines mental health and resources available to address those concerns.	

Table 1: Qualitative codes.

Mental health literacy	Some level of understanding of what constitutes mental health yet there remains a profound lack of awareness of those resources specifically offered in the community.	*"I don't know, but I sure need to find some. I don't know, uh, anybody that needs... that has mental health issues and needing them services (I: Mhm) I've never checked in to that. I know that my insurance and their insurance, you know, have that option for behavioral and mental health issues."*
SES barriers to services	Refers to financial constraints limiting a person's access to mental health care.	*"Um, I guess that depends on the kind of insurance you got. For real. I mean I worked for community care so I know about integral care so I know there's um, the mental health place over there. I think there's a new one on Riverside. So I know they're available but I still think it's all about money and your insurance."*
Personal MH/H narratives	Refers to a person's personal experiences with mental health concerns and resources in the community.	***"****Um, well, I know about depression., um, anxiety. I have anxiety and I have been depressed in the past and I've been on medication before, but I feel like I've overcome that and I'm in a better state. Um, with her, she joked about bipolar earlier, it doesn't run in my family, but depression and anxiety does, so it's something that she might be affected by. That, that's why she's, she's... her moods it's always different. It's never the same, but I just, I... I guess I'm scared to take her to the doctor and actually be told that yes, it is something that she's affected by. It's two/three generations. (I: Mhm) It will be three generations now with her. So, I guess that's why I kind of hold back from..."*
Distrust of systems	Being hesitant to access resources in the community due to previous negative experiences.	Distrust of systems

Table 1: Qualitative codes.

Amicable relationships	A level of willingness to speak to neighbors with simple greetings but do not view or consider it important to foster a relationship with neighbors.	*"Good, I do not talk with anybody. Hello, good day, or goodbye or like that but I do not involve myself like putting myself there or inviting them or just that. No, well I also do not have problems with them or anything, we just talk. A greeting and that's it, but there are no problems with the neighbors."*
Family as community	Family members viewed as community and limited to no contact with individuals that are neighbors due to lack of trust.	
Transportation Access		
Code	**Definition Criteria**	**Example Excerpt**
Motor vehicle dependent community	To interact with various services in the community, an individual relies only on motor vehicle access (i.e., cars, school buses, carpooling, shuttle bus access, or use of rideshare applications).	*"Oh yes. Oh yes. Oh yes. Everybody has a car. Walking is, it's an option if you stay in old downtown Manor, you could walk, but if you say like further down to like get to something important, you need a ride. (I: yeah) Like doctors, dentists appointments, you gonna need a ride because everything is like across 290, a major highway."*
Public transportation accessibility	Public transportation in the community is easily accessible and consistent, to which families can navigate their neighborhood and other areas of the city without a hassle.	*"Every 10 mins, like the ones that run through here…I mean it's very reliable. The bus stops are close enough if you need to ride the bus."*
Language barriers to public transportation	Monolingual Spanish speaking parents voicing difficulty in navigating public transportation, despite availability, due to language barriers.	

Table 1: Qualitative codes.

Affordability of public transportation	Economic constraints preventing access of public transportation	
Cell phone accessibility and reliability		
Code	**Definition Criteria**	**Example Excerpt**
Basic cell phone usage	Cell phone utility is primarily comprised of basic cell phone functions (e.g., to place phone calls, send text messages).	*"Yes, no. More than anything, I always use it to call, or call them, to...to talk over there with my mom and my family. But more than anything, I use it for calls, since I do not access the internet very much."*
Life navigator	Cell phone usage serves a staple for navigating many areas of a parent's life, such as maintaining contact with individuals via social media platforms, check emails, or as a way to find directions around town.	*"Well, I use the cellphone to communicate with families around the country and so to communicate with them, my husband, and my children. Well with family, no? With the schools and everything to do with my children; appointments, doctors, what do I know, friends, and well Facebook, WhatsApp, and all that (laughs)."*
Inconsistent cell phone coverage	Experiencing a frequent change in cell phone numbers or network coverage inhibiting full cellular activity.	*"Uh, I had a phone, it is just that I have had a lot of phones. I had a phone number that ended with XX and then I had another one that was XXXX. I think that you all were sending them to different phone numbers."*

Table 1: Qualitative codes.

	High Responders *N*=10 %	Low Responders *N*=24 %
Participating Parent's Relationship to Child		
Mother	9 (90%)	22 (92%)
Father		2 (8%)
Other	1 (10%)	
Country of Origin		
U.S. Born	9 (90%)	9 (53%)
Foreign Born	1 (10%)	2 (12%)
Language		
English	10 (100%)	14 67%)
Spanish		7 (33%)
Educational attainment of Participating Parent		
High School Diploma or less	6 (60%)	8 (44%)
Trade or Vocational School	3 (30%)	3 (17%)
Don't know/Did not answer	1 (10%)	7 (39%)
Annual Household Income		
$5,000-$10,000	7 (70%)	6 (35%)
$10,000-$20,000	1 (10%)	2 (12%)
$20,000-$30,000	1 (10%)	2 (12%)
$40,000 or more	1 (10%)	2 (12%)
Not reported		5 (29%)
Employment Status		
Employed	4 (40%)	8 (33%)
Unemployed	6 (60%)	4 (17%)

Table 2: Demographic characteristics of parents.

Text response rates by % of all responses	
0% response	8 (27%)
1% response	1 (3%)
6% response	2 (6%)
10% response	1 (3%)
13% response	1 (3%)
21% response	2 (6%)
25% response	2 (6%)
28% response	1 (3%)
33% response	4 (11%)
38% response	1 (3%)
40% response	1 (3%)
50% response	1 (3%)
53% response	1 (3%)
67% response	2 (6%)
73% response	1 (3%)
80% response	1 (3%)
82% response	1 (3%)
90% response	2 (6%)
100% response	1 (3%)
High Responders	
50% or greater responses	10 (26%)
Low Responders	
40% or fewer responses	24 (74%)
SD	60.49
M	166.23

Table 3: Text Message Response Rates, for all responses and by high and low responders *N*=34.

Pre-intervention	*N*	%
Over the phone	13	36%
Online via survey link	16	44%
Mail or home visit	2	6%
Not completed	3	11%
Post-intervention		
Over the phone	17	47%
Online via survey link	12	33%
Mail or home visit	2	6%
Not completed	3	11%

Table 4: Method of completion for pre- and post-intervention questionnaires.

Variable	1	2	3	4	5	6	7	8
1.Text Response Rates	—							
2. Annual Household Income	-.14	—						
3. Educational Attainment	-.22	—	—					
4. Distance from Home to School (in miles by car)	-.05	.08	—	—				
5. Access to Public Transportation (distance from home in miles)	-.01	.14	—	.85**	—			
6. Neighborhood Unemployment Rate	-.06	.28	—	.70**	.83**	—		
7. Median Neighborhood Income	.06	-.31	—	-.57**	-.66**	-.64**	—	
8. Treatment Expectancy	.19	.45*	—	.23	.19	.31	-.20	—
M	60.49	179.96		116.98	89.27	270.46	42236.76	7.62
SD	166.23	388.89		321.47	282.69	271.71	19347.73	1.22

*Correlation significant at .05
**Correlation significant at .01

Table 5: Means, Standard Deviations, and Correlations

Variable		*B*	*β*	*t*
Step 1				
Educational Attainment		-.04	-.09	-.29
Annual Household Income		.03	-.06	-.17
Step 2				
Educational Attainment		-.06	-.15	-.45
Annual Household Income		-.08	-.17	-.51
Treatment Expectancy		47.71	.33	1.56
Total R^2	.11			
Total *F*	*F* (3, 24) = 1.00			

Table 6: Linear regression analysis with treatment expectancy and socioeconomic status predicting text response rates

Theme	Definition	Respondent Type (Low Responders, High Responders, Mixed)
Transportation Accessibility: Both personal and public forms of access	Means of both personal and public transportation that impacts engagement with services in the community.	Mixed
Parental characteristics affecting interactions with systems in their child's life	Personal characteristics or attitudes toward certain systems affecting levels of parental engagement.	Low Responders
Recognition of benefits to school involvement	Recognition of benefits related to involvement with their child's schools serving as a motivator.	Mixed; Primarily High Responders
Cell phones: a way of increasing social engagement	Cell phone utility influencing mHealth and overall social engagement.	Mixed
Literacy levels and interactions with society	Degree of educational attainment and technology literacy impacting social interactions, particularly with the intervention's mHealth components.	Low Responders
Economic factors impeding involvement with systems	Socioeconomic factors impeding parental involvement either with their child's school or with community services	Low Responders
Community: a resource to families	Level of resources within one's community impacting perceptions of the neighborhood.	Low Responders
Networks in the community	Community being viewed as a way to bridge social networks (i.e., connect neighbors with one another).	Mixed
Supporting parents to support their children	Offering additional means of support to help parents feel included in their child's mental health well-being.	High Responders
Personal experiences with mental health concerns: a gateway to knowledge	Parents sharing experiences with community mental health services, either for self or for their child, which consequently serves a source of knowledge and awareness.	Mixed

Table 7: Themes and definitions, by respondent type.

Appendix

English Caregiver Interview Guide

1. What is your current level of involvement at your child's school?
    a. What type of school events do you attend? What are your responsibilities usually? How often do you participate in such events?
    b. What prevents you from being more involved at your child's school?
2. What were your general perceptions of the school group?
    a. Define your role as a parent in the school group.
3. How did those perceptions influence/impact your participation with the weekly text messages and website content?
    a. Were there any other factors that impacted your interactions with the text messages/website?
4. **Before asking the question, have parents recall when their child went on holiday break and any major family changes around that time.**
    a. Describe your level of engagement with the school group prior to the holiday break (i.e., early/late December) and after (i.e., beginning-mid of January). What influenced your level of interaction with the text messages during these times
5. What impacted your ability to fully engage with the website material that provided more information about your child's groups?
    a. How could the website be improved to increase parents' willingness to access it?

b. Describe your level of awareness of the website material.

c. How would you have preferred to receive more information about what your child learned in group that week?

6. What could have enhanced your engagement with the text messages/parent website?

    a. How did you feel about the number of text messages you received?

7. Define Community. How do you view your community?

    a. How reliable is public transportation in your community?

    b. Describe your relationship with your neighbors in the community.

    c. What resources are available in your community?

8. What are your general perceptions of mental health and services available to address those concerns?

    a. What is your knowledge regarding the availability of these services within your community?

9. What do you usually use your phone for?
    a. What is the reliability of your phone's internet access? How has this access impacted by your overall cell phone usage?

Spanish Caregiver Interview Guide

1. ¿Cuál es su nivel de involucramiento actualmente en la escuela de su hijo/a?
    a) ¿Qué tipo de eventos escolares asistes? Usualmente, ¿cuáles son sus responsabilidades? ¿Que tan frecuente participa en estos eventos?
    b) Que te impide ser más involucrada/o con la escuela de su hijo/a?
2. ¿Que eran sus percepciones generales del grupo de escuela?
    a) Define su papel como padre en el grupo de la escuela.
3. Como influenciaron/impactaron sus percepciones con su participación con los mensajes de textos semanales y contenido del sitio de web?
    a) ¿Había otros factores que impactaron sus interacciones con los mensajes de texto/ sitio de web?
4. **Antes de preguntar, haz que los padres recuerden cuando su hijo se fue de vacaciones y cualquier cambio familiar importante que haya pasado en ese tiempo.**
    a) Describe su nivel de involucramiento con el grupo de escuela antes de los días festivos (diciembre) y después (enero). Cuales factores impactaron su nivel de interacción con los mensajes de texto en estos tiempos.
5. ¿Que afecto su habilidad de participar completamente con el contenido del sitio de web que demostraba más información sobre el grupo de su hijo/a?
    a) ¿Como puede mejorar el sitio de web para aumentar la voluntad de padres para usarlo?
    b) Describe su nivel de conocimiento del contenido del sitio de web.
    c) ¿Como prefería recibir más información sobre lo que aprendió su hijo/a en el grupo esa semana?
6. ¿Que pudo haber aumentado su involucramiento con los mensajes de texto/sitio de web parental?
    a) ¿Como se sintió sobre la cantidad de textos que usted recibió?
7. Define la palabra comunidad. ¿Como ves tu comunidad?

a. ¿Que tan fiable es la transportación publica?
b. Describa su relación con sus vecinos en la comunidad.
c. ¿Que recursos están disponibles en su comunidad?

8. ¿Cuáles son sus percepciones generales de la salud mental y los servicios disponibles que abordan estas preocupaciones?
    a) ¿Cuál es su conocimiento sobre la disponibilidad de estos servicios en su comunidad?
9. ¿Para que usualmente usa su teléfono?
    a) ¿Cuál es la fiabilidad del acceso al internet de su celular? ¿Como ha afectado este acceso a su uso de celular en general?

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